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ABSTRACT

Proceedings from a conference designed to promote discussion of the changing role of women in technological society is presented. Following an introduction, the first major address of the conference presents a point/counterpoint discussion on feminism and environmentalism (Judy Smith and Gary Kannenberg). "Cultural Images of Women and Technology" (Corky Bush) looks at women's relationship to technology through an examination of paintings and photographs. "History of Women and Technology" (Sue Armitage) considers the role of the common woman and technology through American history. "Women's Need for High Technology" (Jan Zimmerman) looks at the relationship between women, technology, and economic and political participation. "Women and Appropriate Technology" considers appropriate technology from the perspective of local control. A conference synthesis and list of workshops conclude the publication. (LP)

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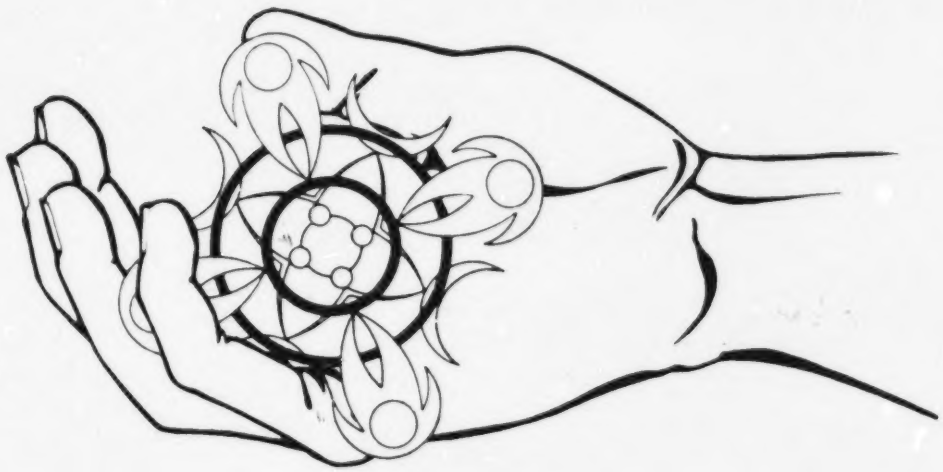
Conference Proceedings

Women and Technology: Deciding What's Appropriate



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Introduction

The conference *Women and Technology: Deciding What's Appropriate* was designed to promote discussion of the connections between major social concerns of the 1970s: the changing roles of women and the impact of advanced energy-intensive technology on the environment and the quality of life. Both of these concerns have stirred great interest and debate in Montana and throughout the country. A growing number of local, regional and national groups provide a variety of programs and publications directed toward public education and involvement in each concern. However, the connections between the two concerns are only now being explored. This Conference was one of the first educational efforts to address these connections.

Although the women's movement and the ecology movement both state they are working to create a future society where people have more personal control over their life choices, there has been minimal communication between the movements. Neither has analyzed the other's concerns nor made steps to build coalitions and share resources.

In the last year, people involved in both movements have begun to discuss the necessity and possibilities of coalition. In Montana a dialogue between those involved in women's issues and ecology issues began in Fall 1978. Participants in two small workshops attempted to identify the commonalities and differences between the women's movement and the ecology movement and to set up ways to facilitate cooperation between the two.

Women and Technology: Deciding What's Appropriate grew out of this process of connection-building. In order to promote broader participation and provide interested Montanans a focal point for discussion of these concerns, a group of Women's Resource Center members and other university and community people began to plan a public education conference. Funding came from the Montana Committee for the Humanities and the Women's Resource Center. AERO, Environmental Studies and the Northwest Subregion Women's Studies Association provided speakers and workshop facilitators and helped publicize the conference. Over 200 participants came from all parts of Montana, Idaho, Washington and Oregon.

The Conference was set up to provide as much time for idea exchange and participant discussion as possible. As planners, we realized that participants would often be confronting new ideas and perspectives they had not previously considered. As a result, small discussion groups were included and speakers were asked to raise questions and outline options rather than propose specific plans of action. Participants reported that they were stimulated, excited and sometimes overwhelmed by new ideas, questions and different points of view. They felt the small group discussions were very helpful, allowing them to respond, ask their own questions, and formulate their own ideas.

Hands-on and skill-sharing workshops, such as carpentry skills, building a solar food dehydrator, and bike repair, were an essential part of the Conference. They provided a chance to learn new skills as well as time to reflect and "do something" rather than sit and listen to speakers. Several of these workshops were designed to give women a chance to learn non-traditional skills that they may have not tried or felt they could learn before. The women who led these workshops were able to share their skills in a straightforward manner and set up a supportive learning environment. Participants commented that they particularly liked having hands-on workshops, which were scheduled throughout the Conference.

The Conference generated a great deal of interest throughout the country. Requests for information and Conference Proceedings began arriving as soon as the Conference brochures were posted. A Women and Technology Network has been set up through the Women's Resource Center as a result of the interest shown by Conference participants and others who have written requesting information on the Conference topic. It is exciting to watch new articles appear and new groups springing up around the country addressing women and technology issues.

The following Conference Proceedings are taken from tapes of the major Conference presentations, which included Friday evening's Point-Counterpoint; Saturday morning's panel, Four Views on Women and Technology; and Saturday evening's Conference Synthesis. Although the speeches have been edited to make them readable, an attempt was made by the editor to maintain most of the presentation in its spoken form, and preserve the individual style of each speaker.

Judy Smith
November 1979
Women's Resource Center

Feminism/Environmentalism: Point-Counterpoint

Judy Smith and Gary Kannenberg

Judy Smith, feminist educator and organizer, Women's Resource Center, Missoula, Montana; author of *Something Old, Something New, Something Borrowed, Something Due: Women and Appropriate Technology*; organizer of feminist-environmentalist ongoing discussions.

As a feminist and someone who is very concerned with the ecology movement as well, I want to outline what I consider to be some of the key issues that we'll be discussing at this conference. I want to emphasize that I represent both of those points of view, and I think it's important to be aware that a lot of people here have concerns in both of these areas. Gary and I are not presenting our talk tonight in opposition to each other, but with the idea in mind that we're working toward some kind of synthesis or possibility for synthesis. I want to start from that premise. I believe there is a basic possibility for synthesis. I am a person who in my own life is trying to bring those two issues and movements together.

I feel that in the past ten years there have been two major social concerns in this country: what is happening with women, and what is happening with energy and technology. Women, growing numbers of them, have been asking questions about their roles. What has locked them into a secondary role? What are the values represented by this secondary role and what can be done about them? A growing number of people are asking those questions, values questions, quality of life questions, about technology and the impact of a "big is better," energy-intensive technology on the lives of most of us who live in this country. I see those as two very important concerns and two important growing movements. My question is, what is the connection between these two? Are there any easy connections we can see, or are they very different issues? Is there a connection between women asking questions about their roles, and many people asking about how the decisions are being made in society? Does that bring us closer together?

For me, this has been a very frustrating concern. In my own life, I've found it difficult to try to integrate the two. Working with ecology groups as a feminist, I was somewhat out of place; most of the ecology groups I would dare say, nationally, and I certainly know in Montana, are still male-run groups, men make most of the decisions and define the issues and priorities. On the other hand, I've found most women's groups are still not very concerned with issues of technology and decision-making in the areas that I was interested in. This left me as an individual, trying to bring the two things together, not really finding support for both of those concerns wherever I was working. When I stopped to analyze it seriously, I realized that I should have expected it all along. In our society, whether we're talking about traditional energy and technology, or alternative energy and technology, we're talking about what has been defined as men's work. Why should I be surprised to find that women's concerns are not given top priority in those groups? After I spent some time thinking about definitions and values, it became clear that it's going to be hard to bring those two groups together. I have begun to think about what I would have to do as an individual trying to move toward a different kind of future for this society, in both directions.

One thing I like to do is to do instant "on-the-street interviews," with people I meet, just to see what they are thinking about, to see if I'm really off (which sometimes I am about what I'm thinking about), or if actually I'm thinking along the lines of a lot of people. When I started getting involved with the issue of women and technology, I found that I was way off. Most of the women I talked to, when I asked them what they think about women and technology, they looked at me blankly. I found they have very little idea what I'm talking about. Some of them gave me a definition about machines, big machines. That seemed to be their definition of technology,

or the one they're most familiar with. Not that they know how those machines work, or perhaps even care how they work. Women live in a technical society where a lot of decisions are being made on the basis of technology, and yet they as a group are not connected to that decision-making process because they aren't connected to technology. That, then, in and of itself, creates a real barrier to women's participation in those decisions.

Last summer, when I did some work for the National Center for Appropriate Technology, I did my "instant interviews" with people that work in appropriate technology, particularly women and appropriate technology, and again, I was met with lots of blank looks. They had really no idea, or perhaps if they thought there was connection, it was 'isn't it too bad that women are using microwave ovens now." The attitude was that women as consumers were moving in directions that were really inappropriate. They didn't think that women's needs and concerns should be given priority in the national debate over energy, or that it was important to analyze the effect of technological decision-making on sex roles. With that experience, with both groups, as I said, I found myself somewhat frustrated.

However, I do feel that there is a growing group of people, particularly women, that are aware that if women are ever going to have any kind of power in this society, they have to get involved where the most important decisions are being made. Right now, for better or worse, those important decisions are being made on technological issues by a very small group of people, that I'm not sure represent very many of our interests. I know they don't represent mine. Therefore, this growing group of women is aware that it's going to be very important for women to assess their own priorities vis-a-vis technological decision-making, and to decide for themselves what the impact of what we call "high technology" or energy-intensive technology, so-called "modern" technology, has been on women's roles, and what the impact will be if we turn toward a less energy-intensive or "lower" technology. In assessing that impact, we must decide what priorities women will have. And women must enter the decision-making process, to make sure that those priorities are carried through. And as I say, I think there's a growing group of women that are very concerned with these issues. Probably many of the women that are here will identify with that position. So from that, let me tell you what I consider to be the basic issues.

One of them is, as I mentioned earlier, deciding what has been the impact of modern technology on women's roles. We've seen an incredible development of technology in the last thirty years, and incidentally, or not incidentally, a broadening of definitions of what women see as their role in society. Are those two correlated or not? It's an important question. I can give you some examples of where I think they're correlated. I certainly don't have any long-term proof of this, but it's something I think you might want to spend some time thinking about—has modern technology, energy-intensive technology, affected women's roles to the point where women now have many more options, or at least, more free time, more choices than they have had in the past? Let me give you a couple of examples. One is the microwave example, that is, more free time from home maintenance labor. Microwave ovens make sense to me in one way. When you talk to women who buy microwave ovens, ask them why they're buying them. Most women will tell you it's because they really feel they will save time in food preparation. Ask women why they use perma-press fabrics. Ask women why they have "home technologies," and most of them will tell you it's to save time. Very few women I know are willing to go back to putting in the amount of time it would take to run a home in a low-energy situation. Women's time has been freed. Some may decide to do extra work around the home with that time; whatever, they certainly have more choice about how they're going to spend their time at home. An interesting correlation to that, is the possibility of having two jobs, which is what many women have now—working eight hours outside of the home, and then coming home and working eight hours again. The possibility of doing that is produced by the labor-saving technology that is now available. A lot of people feel that if we didn't have this kind of labor-saving technology, women would not be able to work in the kinds of jobs that they have outside the home, particularly single-mothers, heads-of-households, who would find it impossible to be able to have an economically independent job in addition to taking care of a family at home. It may be really true, that the development of this kind of technology has freed women's time, and given them a chance not to be so limited by the home environment.

Another example of the impact of technology on women's roles is, through highway construction, over the passes, all that technology in big machines. One thing that has affected role definitions in this society is that muscle-strength is no longer a bonafide employment qualification, because technology has removed all that male advantage of bicep muscle. There's almost nothing that a man can do that a woman can't do, given technology. Whether that's important or not, one of the interesting things about it is that it has opened up jobs. I don't know how many of you have talked to people in the Forest Service who have argued that a woman just couldn't do certain things. They used to say she just doesn't have the capability. Now with the kind of technology that's available, women have the capability to do it. And

Rachel Burger/cpf

there seems to me, very few jobs for which the argument could be made that there is some biological reason that a male should do it, based on bicep muscle. This is another area that has been opened up with certain kinds of technology.

A third area that's very important to me, because I work in women's health, is the question of effective contraception. That's a fairly energy-intensive, high technology that we've come up with. Whether it has problems or not, and I agree that it does, this technology has really expanded women's role options. For the first time in history, we can do away with unwanted pregnancy; because of being able to do away with unwanted pregnancy, you'll notice that women are having fewer and fewer children. Women are choosing to have fewer children because they want to maximize their own time, and have more control of their life decisions, which apparently, technology has allowed them to do.

There are some negative effects that I can see from advanced technology on women's roles as well; I want to just mention a couple of them. For any of you who are from a farm family, you may remember this. As machinery enters the farm, women are less and less likely to do the jobs that require machines. This is an interesting twist on how technology can free women, and at the same time can limit them. We still believe that machines belong to men. Though machine technology gives us the ability to do a task, somehow we think women should not be using the machine. For example, when you go to a farm, who's out there driving the diesel tractor? Men. Is there any reason for that? No, not particularly; a woman could drive a diesel tractor just as easily as a man. Then why is it overwhelmingly men that are driving diesel tractors? Well, when machines come into a role, it seems to drive women out of them. Unless women get more control of that technological system, this may happen to us more and more, as we move toward more dependence on technology. This is a possible limitation that women may see from using more technology. For a perfect example of what I call the "machine prejudice"—notice sometime when you're on a trip, how many cars are driven by men. Well, that may not seem like a big thing, but after you begin counting, you realize that in almost every car containing a couple, the man is driving the car. In many cases, if you start talking to people about who owns the car, and who makes the decisions about the car, a man does it. It's a male machine. Most of the machines we have are male machines. In fact, women, in our kitchens, use machines, but who do we ask to take care of those machines? Very few of us actually take care of them ourselves. We still have that image of the machine prejudice; the person who works on and understands machines is a man. If we rely more and more on machines, this may be a limitation for women, unless women change that basic prejudice.

This is what I mean by *assessing the impact of technology on women's roles*. There are ways technology has expanded role options; there are also potential limitations from relying too much on machine technology. These things will have to be balanced and weighed.

A second issue that I think is very important is what the impact on women would be if we move toward a lower-energy intensive technology. If we move back to some of the technologies that were available, say, 20-30 years ago. Would that really limit women's role options? Would giving up this kind of technology mean that we would have to spend more time at home? For example, if you don't have a microwave oven, and you have to go back to baking bread, how much time off are you going to have? That's one of the questions that people need to take seriously, because as we look at less energy-intensive technologies, we tend to often look at the technologies in the home. That means we're talking about women's time. We're talking about things women do: running a wood-burning stove, preserving food, taking care of clothing, things that women have had to spend their time on in traditional roles. Women may not find that very attractive. I have visited many friends who have decided to go back-to-the-land. What I noticed time and time again in that living situation, is that back-to-the-land, for women, means back-to-the-kitchen. In my experience, women accept very limited role options, as a result of trying a back-to-the-land experience. Now I'm not arguing that they are *necessarily* related. But I am arguing that it seems to be easy to go back to very traditional, limited roles in which women's energy is focused on home maintenance. So are women going to pay a disproportionate price if we move toward a less energy-intensive technology? What are we going to have to give up? I think that's something you have to ask, when making an assessment of technology.

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A third thing that I think is important to ask in this area: are there other ways to meet women's needs besides a reliance on technology? In other words, can we actually use social policy? Do we have to have machines to take care of the problems, or can we get rid of sex-role division of labor by agreeing, somehow, that it will go away. Is there a way for us to say that women will no longer be primarily responsible for home maintenance? No longer will women be responsible for child care, and we don't need machines to do it, because there is 49% of the population who could help out. The issue, then, is that men must become involved in all the things that women have done; rather than going toward machines, we would go toward equal sharing of the different kinds of work

that need to be done. Day care is a good example. If women's time is going to be freed, perhaps one of the ways we can do it without relying on technology is to use a labor-intensive system of day care, where people, not just women, provide day care. These are possibilities, and things that you should ask yourself—are there ways to get out of our reliance on technology by making basic social policy changes? And how feasible are those? Some of us are fairly cynical about the possibility of getting men to replace the technology that we have now.

Then the next question is, are women willing to judge technology solely on the basis of sex-role impact? In fact, one of the things I suggested in a paper I recently wrote is that we have a sex-role impact statement, just like we have environmental impact statements. Every policy, every technological decision, has to be analyzed from the point of view of sex-role impact—will it restrict women's roles, will it increase role options? If something is going to increase role options, by definition it would be appropriate; if it will decrease role options, by definition it would be inappropriate. How much would we be willing to trade off to reach that standard? Would you be willing to use up a lot of energy to get that standard? Would you be willing to deplete resources to get that standard? It's something that's interesting to ask: can what's appropriate or inappropriate technology be decided by women's interest level?

Shifting away from the assessment of technology by women, I want to throw out a few other areas that I particularly find interesting. For one, we don't even know what technology could possibly do for women, because women have no control over it. What would it be like if women actually made the decisions and set the priorities for technological development? We don't know how different that would be, but we do know what happens to women when they don't control technology. A perfect example is what has happened with birth control technology. I'm not going to spend a lot of detail on that, but we do know that when birth control technology first appeared, it had very negative effects for women. The kind of technology that was made available was effective, but it did a lot of damage to women's bodies, and we have evidence that there was no adequate risk assessment of that damage. This technology was not controlled by women, women did not do the research, women did not do the marketing. What kind of birth control would be available to us now if women were the ones making the decisions on what birth control was going to be available? Did you notice in the Missoulian that China now has a pill for men? They have that pill for men within three years of having a pill for women. Do you know how long it's taken us, and we still don't have a pill for men? What does that tell you about priorities for technological development? In the article in the paper, there was a direct quote saying, "the reason we did this is so women can be on the pill for one year, and then men can be on the pill for one year." That tells you something about priorities for technological development. What I'm saying is, we don't even know what technology could do for us as women, because we've not had control over it.

So how do women obtain control? What do we do to get significant control? I'll give you a couple of quick ideas. One of them, obviously, is that we have to challenge the existing dynamics of technological decision-making, where a very small group of people make decisions for the rest of us. They happen to be a small group of people that belong to what's considered a technological, or educated elite. We have to open up that decision-making to the rest of us, and let our needs and experiences really be reflected in that decision-making. How are we going to do that? That's an important question. One way we're going to do it is, we're going to all learn a lot about science and technology so that we can really be involved in the process. Very few of us can read Amory Lovins' articles and really understand what he's talking about.

Rita Knauff

Most women can't, anyway, and a lot of that comes from math and science anxiety. If you open up a book with pages and pages of figures and projections, how many of us really feel comfortable, and think that we could make an informed choice about the options? Very few of us. Basically, I'm saying that we're going to have to get more involved and educated as consumers, and as producers. Women are going to have to become more involved in career science and technology, and become the decision-makers on how this kind of technological development is going to go. And that means that women are going to have to get into different kinds of programs than they're in now. I'm sure you know that still only 6% of the scientists in this country are women, and that the large majority of people who work in engineering are men, less than 6% are women in engineering. We're going to have to get involved as educated consumers, and educated producers; we're going to have to get over our anxiety, we're going to have to end discrimination. We're going to have to positively recruit women into these areas. And as you know, as a social policy concern, affirmative action right now is under severe threat, and to me, there's an open question whether affirmative action is something this society is willing to do. That raises a lot of questions about how we're going to get more women involved in technology and science.

A couple of last issues: for one, what can women do to insure that the appropriate technology, or the ecology movement, whichever word we're going to use, that this movement reflects the needs and concerns of women? Well, of course one of the things we have to do is get involved in that movement, and get our priorities incorporated in that movement. But another thing I think we're going to have to do, and one that's going to work better, is to show the people

working in appropriate technology that if they don't interest women, they don't have a chance to change the way technology is used in this country. Because women are the consumers in this country; women right now do 75-85% of the consumption. And if women decide that they don't want to go back to woodburning stoves, or they don't want to go to solar technology, or they're not interested in spending their time in home maintenance, it's probably not going to happen. Women in some ways are in an interesting power position. We're the ones who have always been the consumers, and it's very well possible that if appropriate technologists don't get to us, and show us that it's in our interest, it won't happen. I would argue that since most things change because people perceive change in their own self-interest, that's probably the best route to go to convince people in the appropriate technology movement they need to include women.

And the last area that I want to mention is the issue of whether the women's movement and the appropriate technology movement can work together. Are their priorities close enough together, do their values really reflect a similar vision of the future? I would argue that they have to. There's only a certain limited resource available for social change in this country. And if we don't use the available pool, put it together, neither of us probably will have much chance of making change and creating the kind of future we want. But on the other hand, I would also argue that we have a real problem historically in how women have tried to work with other groups. In every example we've ever had, whether it was the civil rights movement or the anti-war movement, women's priorities were put last. One of the problems that we've always seen is that women see the other group's interest as legitimate, and accept the other priorities as being important as their own. So what's the chance for all of us to be working for an ecologically sound, nonsexist future? When will we see both of those terms as being important as the other? I leave that as an open question to you; I'm not really sure what I think. I want to believe it's possible, but the part of me that comes out of the 60s is fairly cynical about the possibilities.

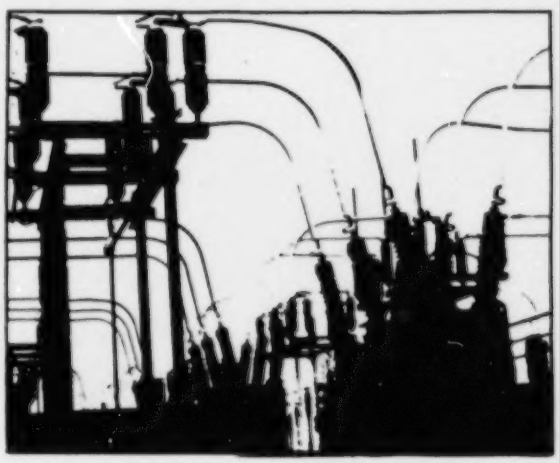
So these are the basic issues we're going to be addressing at the conference. And they come from, as I mentioned earlier, a point of view of someone who feels herself to be a feminist, but also feels herself to be involved in ecological concerns.

Gary Kannenberg, environmentalist; teaching assistant, Environmental Studies Program, University of Montana.

My purpose in speaking to you tonight is threefold: first, to present to you the view of an environmentalist in this electrified, automated world of modern technology; secondly, to try to explain what appropriate technology is and what role can it play in our future; and lastly, to try to show you what opportunities and advantages I see a society based on appropriate technology has to offer to women.

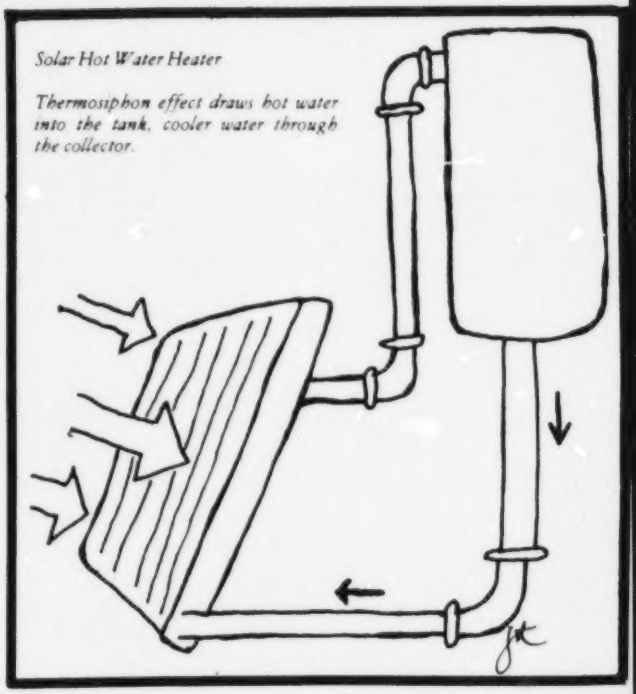
I call myself an environmentalist; but in a way, I'm sure everyone in this room is an environmentalist, because they're concerned about their environment, they're concerned about the world we live in. I call myself an environmentalist because I place the environment very high on my list of priorities. I do this because as we're constantly exploiting our mineral resources, to supply the materials to support our modern technology, and as we're exploiting our energy resources to supply the energy needed for our modern technology, we're ruining our environment. Air and water pollution is rampant all over the country. Wilderness is decreasing. Electrical usage in the U.S. has doubled per capita from 1950 to 1960. It's doubled again from 1960 to the present. Why is this, why are we using so much more electricity? A quick walk through a house today as compared to a house in 1950 will show you the reason. You see a big color TV in the living room. A nice porch light out in the front yard. You go in the kitchen and see every electrical appliance you could ever dream of—an electric dishwasher, microwave ovens. You go in the bathroom, you see curling irons, you see mirrors with different lights, you see blowdryers, you see hot lather dispensers and electric shavers. You see clock radios in the bedroom. But all these electrical appliances we use aren't the main reason why electrical usage has quadrupled in the past 30 years. To see the main reason, ask yourself, how many all-electric homes did we have in 1950? How many people had electric ranges? How many people had electric hot water heaters? How many people had air conditioners? How many people had electric clothesdryers? These are the main sources of electrical consumption in the house.

To understand what we're doing, you have to understand how electricity is generated. Most of our electricity comes from what are called *thermal plants*. Hydro-electric sources,



dams, provide a small amount. The process in these thermal plants is basically, that water is boiled by some fuel, the steam drives a turbine, which drives a generator, which produces the electricity. The different fuels that are used to do this are: coal, like out in Colstrip, used mostly in the Rocky Mountain states and the midwest; oil and natural gas, used mostly back east; and nuclear fuels, used all over the country, but mostly back east. The problem with thermal plants, other than the tremendous quantities of air pollution and water pollution that they put out, is the efficiency of the process. With all these processes, coal and oil, natural gas and nuclear, only about one-third of the energy in that fuel is converted into electricity. The rest of it just goes up the stack as waste heat, or else goes into a river or a lake. So what's happening is that we're using a coal boiler with a flame at 1200°F, to produce electricity to heat hot water at our house at 140°. Oil and natural gas boilers burn at about 1200° too. And that produces electricity that we use to dry our clothes. In a nuclear power plant, the core of the nuclear reactor is over 2000°. This is making electricity so that we can have an electric resistance heater in our house to heat our house at 70°.

Now, if I could backtrack just for a minute, to talk about what is an environmentalist. Environmentalists are not anti-growth people, we're not anti-business or anti-development. We're concerned about all this waste that's going on. We want to see the practical, efficient use of our resources. And these are our resources, our country's resources. They don't belong to the energy companies primarily; they lease them from our government. Modern technology can help us; but we've seen too much misuse of modern technology. Basically, we're inappropriately meeting our energy needs. We're using the wrong fuel for the wrong jobs. What we need to start doing is matching our choice of a fuel with the end use we want it to perform. And there's a word for doing this, a word for technology that does this, and that's *appropriate technology*. It's simply matching the choice matching the energy source to the end use you want to obtain. Now, using electricity for heating purposes is terribly inappropriate. You have those huge temperature differences between the temperature in the boiler, and the temperature you need to dry clothes or heat water. It makes much more sense for cooking to use natural gas and have the direct flame right under the pots and pans, than to have an electric boiler making electricity for an electric burner. What other types of appropriate substitutions could we have like that? Well, to dry our clothes and to heat our hot water and to heat our houses, the best source for all these purposes is the sun. Solar technology can supply hot water to any home in the continental U.S.—the technology's there. To heat a house anywhere in the country is a little trickier. But with the proper insulation, the proper design of the house, the proper orientation of windows, it can be done. Insulation is a very good appropriate technology, because it requires very low energy for manufacture and installation, and provides excellent returns. Conservation methods could also be called an appropriate technology, because you're saving energy with very little input. So we have to start using appropriate technology, that is, matching the input to what we want to get out of the different technologies.

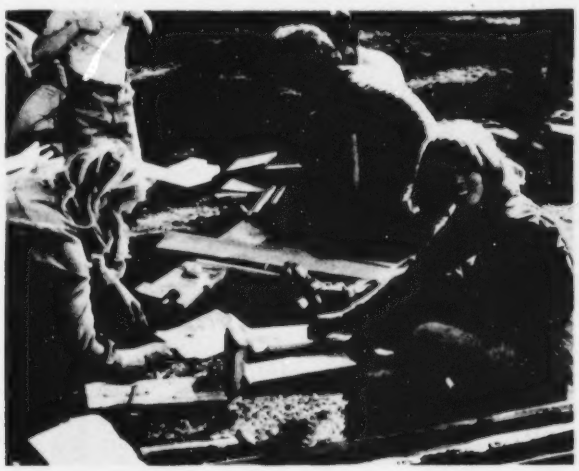


And a lot of questions come to mind, when you start talking about this. How do we start switching over to appropriate technology? What gets moved over first? Who's going to decide what role appropriate technology is going to play in our future? I see the role of appropriate technology as being not decided by the Department of Energy, James Schlesinger or any of those people, not by the Nuclear Regulatory Commission, or the Board of Directors of Montana Power, or Exxon or any of them; but I see the role of appropriate technology as being decided by the consumer. When the consumer has had enough of excessive profits by the energy companies, when they've seen enough of the destruction of the environment, when they've seen enough misuse of resources, they're going to take matters into their own hands. And that's happening today—you can see people heating their homes that way. You can see people conserving energy. Appropriate technology is capable of reducing our dependence on energy companies, on the people far away from us who make decisions controlling our price of energy, and how our energy demands are met.

This brings us to the point that is one of the focal points of this conference. What opportunities and advantages will appropriate technology afford to women? To explain this, I'd like to outline some paths you can take to reach a point where we would be able to make decisions concerning our own energy supply. We could decide how our energy demands are going to be met, and we could decide how much our energy is going to cost us. There are several paths you could take to reach a decision like this. The first path is you could go down to Montana State, and get a degree in mechanical engineering or chemical engineering, and go to work for Exxon or any of those energy companies, and put in a good 20-30 years with them, moving up the ranks till you get a nice vice-presidency, and there you'd be in a position to make

decisions that would affect the energy supply and the cost of energy to everyone in the country. Or you could take a comparable route through government. Get a degree, work your way up in government—actually the best way in government would be to find a candidate and support him early in the primary, that's how most of Carter's energy staff got appointed. And there is another path you could take, that's much simpler, doesn't involve going and getting advanced degrees in engineering, doesn't require excessive math and science skills. This path would require a phone call to AERO, the Alternative Energy Resource Organization. Find out when they're having a workshop on solar energy, or on appropriate technology. Sign up for one of Dick Sheridan's energy classes here at the University, or John Mean's environmental design class here. Take one of the center courses offered by AERO or another group on appropriate technology. These courses will teach you how to be able to make decisions on how you want your energy needs to be met, whether you want them met the conventional route, or whether you want to try something different. These courses will teach you how to follow through on your decisions, what companies can help you install these appropriate technology devices, or to build them yourselves. The math skills necessary to do these appropriate technology and alternative energy calculations are not beyond anyone in this room. They're simply plugging numbers into formulas. The formulas are all there, in books. The carpentry and plumbing skills necessary to build a solar food-drying oven are not beyond anyone in this room. Even if you don't build these things yourself, you can still figure out how to meet your energy needs. So the choice is there to be made. There's the two paths. The first, requiring years of study, gaining an engineering degree, 20-30 years work, promotion; this path also requires a continued trend in this country toward centralized, environmentally-destructive power plants. By taking this path, you're assuring a commitment toward destruction of the environment, because that's what's going to happen if we continue along the road we're on now. Or you can take the other path, which just requires attending some conferences like these, and participation; a willingness to change, to learn something different, to be slightly unconventional. This path requires that you take the initiative, to do something positive, both for yourself, and for your environment.

Now I see the women's movement and women in general as wanting freedom. They want freedom to pursue the career interest of their choice, and freedom to pursue the recreational interest of their choice. They don't want to be tied down in traditional roles, they want to gain control of their lives. Energy is such a big part of our lives now, that to gain control of your energy supply, and your energy cost, would be a very significant achievement. What would be better than to chop off at least part of the umbilical cord Montana Power has attached to us? The opportunities for women in appropriate technology are widespread. This isn't a field which is going to require advanced engineering knowledge, and scientific skills, and mathematic skill. It's not going to require huge capital investment, which would limit it to only a few mega-corporations, international corporations who could afford to support the technology. Many more permanent jobs will be created by an appropriate technology society than the conventional energy technology path we're following now. These jobs will be widespread, they'll be in business, in manufacturing, in installation of these devices. And in educating people as to what appropriate technology is all about. And it's on this point of education that I'd like to close, because when it comes down to it, that's why we're all here, at this conference, is to learn. To educate ourselves so that we'll be better able to run our own lives, and hopefully when we leave here, we can go and share the knowledge we gained here with other people, and show them that maybe there's a better way to do things than the way they're doing them now. Because as I see it, for both the women's movement and the environmental movement, the greatest barrier we have to overcome is the ignorance of people as to what's going on in the world around them.



Solar Food Dryer Workshop

Four Views on Women and Technology

Corky Bush, Sue Armitage, Jan Zimmerman, Elizabeth Coppinger

Cultural Images of Women and Technology

Corky Bush, Assistant Dean of Students, University of Idaho, Moscow, Idaho; Coordinator, Northwest Women's Studies Association; Founder, Rural Women's History Project.

I believe that some cliches are absolutely accurate, and a picture is worth a thousand words; so these visual images are worth several thousand words. Today, instead of reading to you from the multitude of literature that's available about women and technology, or talking about how women are seen in terms of technology and nature, I've brought some slides to show visual examples of how, in American painting, artists have conceptualized women's, and men's, relationships to technology. I don't think the images are clear of women unless there's a contrast with the images of men in technology, and contrasting and comparing how the treatment of men and women is different in American painting helps point out the values of technology and nature.

It's not, as I said, possible to talk about women and technology without talking about men and technology. The title of this slide is *Pat Lyon at the Forge*, painted by John Neagle in 1826. This is one of the very earliest portrayals in American art of the common laborer: the American man at his job. It's painted quite romantically, quite positively. A couple of exciting things about this painting: first, Pat Lyon, the subject, was the first American to say, "I want to be painted as I am, where I work," rather than, "I want to be painted as an aristocrat, in a setting in which I do not live." This is the beginning of the realism that denotes American art. It's possible to say it's not particularly realistic; but, compared to previous portraiture, this is an extraordinarily realistic portrait. You'll notice though, that Pat Lyon working is a subject about which the artist feels very positively. It elevates the common man in the common role to show Pat Lyon, and thus all laborers, as the epitome of the American tradition.

Women worked too; this is one of the typical areas in which they worked. *New England Country School*, by Winslow Homer. You'll notice that there's quite a difference in the treatment of women and their work, and men and their work. This woman is a school teacher—traditional occupation for women. At the time, however, that this painting was painted, this was not a particularly traditional occupation. Most schoolteachers, in the early years of the country's settlement, were in fact, men. It was only after communities were stabilized that women were even allowed to teach. You'll notice that the two different artists' depictions of these works are somewhat similar. There is an emphasis on realism; there is a typical American view of nature. You see the houses, hills, fields and mountains in the background of the country schoolteacher. In the portrait of Pat Lyon, you see the sky and the courthouse. These are very typical and representative of the themes in American art about working; there's almost always an attempt to connect the subject with nature or with the outside world.

Next is the *Gun Foundry*, painted by John Ferguson Weir, in 1866. This is the interior of a gun casting and manufacturing plant in New Jersey. This shows the same treatment, again the common laborer at his common work. What's going on in this painting is that these men are forging a gun to be used in the Civil War. Though you would never notice it from the romantic treatment of the subjects, John Ferguson Weir intentionally set out to paint American subjects, to make them both real and valid. You can see he's done this with the brown and amber tones, with the men working hard with their shirts off. There are two women in this painting—to see them, you must study it very closely. If you look at the right corner, at the bottom, you see a little cluster of figures standing off at the side. Two of these are women. This is pretty typical of the relationship of women to machine technology. Behind them is a Union army captain, gesturing to them, pointing out the sights, and the two women are marveling.

Women worked in factories too. Look at the different treatment in these two paintings. The title of this one is *The Morning Bell*, and this group of women is walking into the textile factory in Lowell, Mass. You would never note it from this particular painting, about the only painting in the 1800s depicting women working in an industrialized or factory situation, and you can see the difference. Women, actually young girls, were the first industrial workers in America. When I say the first industrial workers in America, what I mean is they were the first people to work predominately

"Steel," *Modern America* Mural, Thomas Hart Benton
New School for Social Research, New York

Amalgamated Mural (detail), Joseph Hirsch
Amalgamated Clothing Workers of America, Philadelphia

outside the home for wages, in a non-domestic situation. What this painting does not recognize is some of the horrors of that industrialization: these women worked for very low wages, usually from 6 a.m. to sometimes 10 at night; they lived in dormitories, which were constructed by the Lowell factory people, because you couldn't have wage-earning women just out on the streets, living on their own. It's interesting to note the terrible reputation that women in this painting would have had. They were considered to be licentious, things that are associated today with women who live on their own outside of the domestic family. Now all the things I've just told you are the real truth behind this painting. You cannot tell the real truth by looking at Winslow Homer's romantic depiction of it.

Women's role has been conceived in art as the family. This is by Mary Cassatt, *Emmie and Her Child*. But men had family responsibilities too. The title of the one on the left is *Our Good Earth*, by John Stewart Curry. You'll notice that in Cassatt's painting, the child is almost as big as the mother. You'll also notice that there's a real attitude of tension between the mother and the child. Most people who've examined Mary Cassatt's work have said that this is because she was frustrated, she never married and never had children, and so she had a depressed womb. As a consequence of her depressed womb, she painted only subjects of women and children. It is true that she painted largely subjects of women and children. What most people don't include in that story is that she was studying under Degas, who was an infamous misogynist, who said, "There is only one subject for the woman painter, and that is the home." She wanted to work on impressionistic techniques more than she felt that she had the freedom to explore other kinds of subjects, so what you see is not Mary Cassatt's depressed womb, but the European and American painting establishment telling her about the only fit subject for a woman painter.

Our Good Earth is one of the few things that I could find in American art that shows just a man and children. Almost all other paintings show a man, and woman, and children; or a man, several women and several children. And there is a great difference in the way these paintings are presented.

Women's job was the family. This is called *Thanksgiving*, and what is depicted is everyone scurrying around trying to get the Thanksgiving dinner on the table. There are children crying in the background; at the back left, you have a new guest arriving; there are people in the back room saying, "Where is my dinner?" There is a woman taking the turkey out of the oven, doing last-minute preparations, in a flurry of activity. This is women's work. And this is the treatment of women's work. It's somewhat frivolous, humorous, a little frenzied; fun.

Now, this is men's work. This is "Steel," from *Modern America*. You'll notice men, working with machines, forging the steel. Steel working is a tremendously vital theme in American painting. I could have brought a hundred steel working paintings to show, and this is typical of the genre, if steel worker painting is a genre. Notice in these two paintings, the difference in the treatment of the characters, and the difference in the nature of the work.

Men also ate. This is *Steel Worker's Noontime*. You'll notice, even when they're having lunch, they are flexing

their muscles and showing off to each other. Compare this with the next slide, Edmund Tarbell's *My Family*. Women's work is not treated here with humor and exaggeration, it's treated with almost reverence and stillness. Obviously this family is very peaceful, serene, and sedate; things are calm, nurturant, and quiet here compared to the obvious continual frenzy of activity of steel workers.

This is *The Bridge*, by John Koch, 1951. I must tell you that despite the subject matter, this is an excellent painting. And it's one of the only really great paintings that is in this presentation; it redeems itself on that level. The woman's ironing, and the sick child sleeping, reflect the same patterns and shapes and design of the bridge in the background. We can only assume that women's role is to stay in the home, care for the children, do the ironing, and if you're really lucky, you can replicate in some of your activities, the excitement, the design and the scope of the bridge outside.

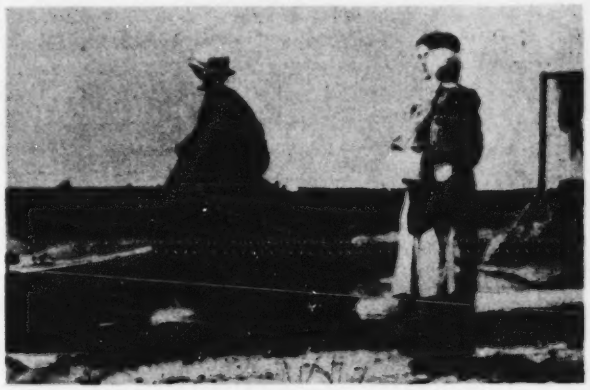
Lest you think that I am making up, or making conscious something that was unconscious in the artists, this association of men with activity and industrial work, I want to call your attention to this painting. This painting is *The Man Trip*. These are men about to go down into the coal mines, and I think the imagery is phallic as well as virile and macho. They're about to go down into the coal mine, they're about to embark on the "man trip."

This one is also by John Ferguson Weir. The title of this painting makes clear the symbolic or metaphorical relationship between men, masculinity, and work and industrialization. The title is *Forging the Shaft*. It doesn't take a great deal of close examination to figure out some of the sexual imagery present in this painting.

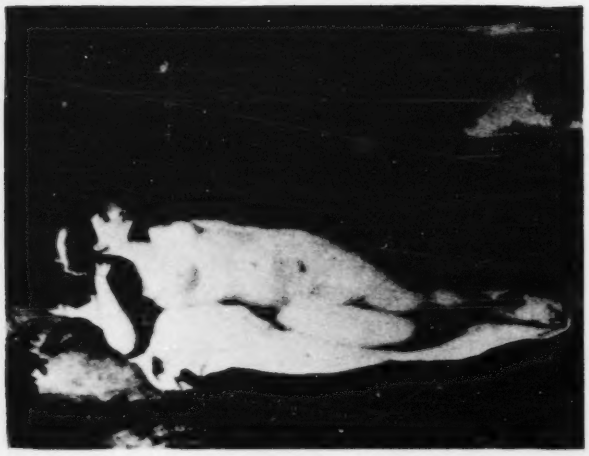
Women too had a role in industrial society. This is *The Factory Town*, by a woman, Lois Head. Despite women's long history of working in the labor force, in industry, this painting shows the common relationship of women to the work force, carried on from the times of the Lowell factory girls; women are shown as prostitutes. This is a very different cultural image, very different scene of women's participation in the laboring force. Here are two men who have decided to go on home, I guess, and disregard her solicitation; they're carrying either lunchbuckets or tool cases, and are walking down a pretty typical urban street with lots of air pollution in the background. I juxtaposed these two paintings becaue I think together they also demonstrate very vividly the symbolism and the imagery that commonly characterizes the cultural image of women & work, and the cultural view of men & work.

Because laboring conditions didn't always work well, there was a history of labor organization. The title of this is *The Strike*. What you see is some men gathering around the mill owner, who has on the top hat; a man in the foreground is picking up a stone, about ready to throw it. These men are just beginning labor organization. In the center of the painting is a woman, who is pleading with a man not to strike. And he replies with this, "but what can I do?" attitude. Off to the side is a woman and two children, who are begging. They are stepped away from this scene; they realize that they're not going to get any money. This painting was a shock and a scandal at the time that it was exhibited in the 1890s. It showed the laboring person, and that was all right,

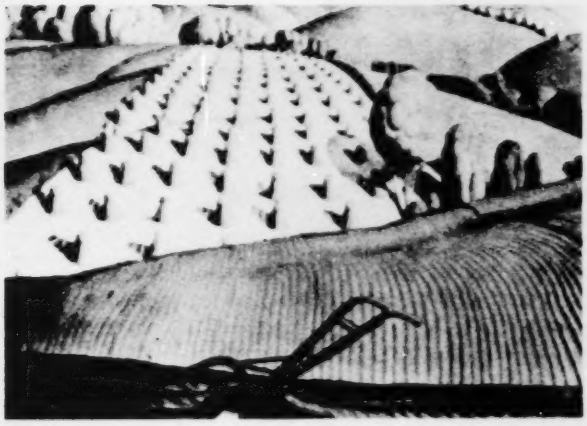
Idle Hours, Julian Alden Weir
Metropolitan Museum of Art, New York



Waiting for Dad, Winslow Homer
Collection of Mr. & Mrs. Paul Mellon



Ariadne Asleep on the Island of Naxos, John Vanderlyn
Pennsylvania Academy of Fine Arts, Philadelphia



Fall Plowing, Grant Wood
John Deere Collection, Moline, IL

but the public and the reviewers were incensed at the the depiction of women in this kind of common, political, degrading activity, though it was the fringe.

Another part of the myth of women and labor, of women and work, is that women accepted their conditions, enjoyed them, and resisted striking. *The Amalgamated*, which is the next slide, a beautiful mural of a labor union; you see the men are calling on the women to organize, but the women retreat off the edge of the painting, in this blur of passivity, non-concern, just doing their work. There's only one of those women who has any facial identity at all. The rest are hunched over their machines—the implication is that they are unmovable, uncommitted to the labor movement, labor organizing is the work of men.

When women do organize, this is evidently how they do it. The title of this is *Strike Talk*. This was a painting commissioned about the Ladies Garment Workers' Union, if you've read anything about that, it was a very physically active, political organizing effort. You can't tell from this painting, where women are organizing in a very passive, sitting-down way.

One of the things that results from labor organization, and you'll never be able to tell it from the depictions of women in the labor movement, is violence. This is called *Trouble in Frisco*, painted in the 1840s by Fletcher Martin; and this is *American Tragedy*. There is one woman in the latter, in the foreground; she's pregnant, and she's being protected from the onslaught of the police by a very virile man who's in the process of slugging a policeman. There's another woman who's being shot off at the side, and tumbling decorously. This is how our culture views the labor movement. This is not how the labor movement was.

Men are responsible for the out-of-home activities, even in agrarian society. The next series presents scenes of male activity and female passivity, the same themes were depicted in the labor art, only slightly differently. Here, the man is trudging back from the end of the hunt, carrying a rabbit and a rifle. The figure that looks like a pine tree behind the house there is really a woman, waiting for her husband to come home. This is called *End of the Hunt*.

Even when men and women are pictured working together in the same scene, there's a difference in the depiction of their activity. In *Spring in Town*, here's a man who's literally digging up a garden, which is about the same size he is. This disregards all the evidence we know about gardening in the U.S., which is that gardening, milking the cows, and caring for the chickens, until they were sold as commodities, was predominantly women's work. Women took care of the gardens; men took care of the fields. This painting literally defies that. Women are shown two places in this painting—there's a woman hanging up a quilt on the line, in the left foregound. In the background, there's a woman standing in the door of the house, yelling at two men who are climbing up to repair the roof. There's a man who's pushing the ultra-complicated industrial machine, the lawnmower.

What do women do? We wait. The title of this is *Idle Hours*. It's painted by the same painter, John Ferguson Weir, who painted those memorable art works, *Forging the Shaft* and *The Gun Foundry*. Soon, the idleness of women becomes an important thing in its own right. Women begin

to assume the status of decoration. If your purpose is to wait, while the real work is being done elsewhere, there's a value in waiting beautifully and peacefully. And that value in waiting beautifully and peacefully is that you do take on a role, the role of ornament or decoration, so that you have literally beautiful and serene paintings of women, the intent of which is twofold. One is to show women in a very peaceful, serene, decorative lifestyle, and the other purpose is to decorate your homes with those decorations. This is more clearly captured in the next slide: this is *The Wyndham Sisters*, and here you have a painting within a painting within a painting, actually, there are three paintings of women here. Wome are waiting, attractively and decorously, then that painting's being used itself as objet d'art, and within the painting is another one being used as an object of art. Obviously, when beauty, serenity, luxury, and ease, this senuous detachment, are ideals, it doesn't matter that women's lives were lived in quite a different reality. A culture sees what it wants to see; America has wanted to see women as passive, as beautiful.

The most important thread in American art on women is equating women with nature. The title of this painting is *Ariadne Asleep on the Island of Naxos*. This is by John Vanderlyn, painted in 1812. It's the first nude ever painted by an American, and shown in America. It scandalized society for about 3 years; and it was later copied and recopied, and became the prototype of all the paintings you see in all the restorations of Victorian bars. Ariadne, as you may know, gave Thesius the string to get through the labyrinth. They escaped to Naxos, the island shown here, and he deserted her. What may be hard to see in the background is a little triptych of two men, either getting into or coming off of a boat. This is the beginning of the archetypal pattern in America—associating women with beauty.

Now, you may think that this was subconscious imagery, until you look at this painting by Eakins. The title of this painting is *William Rush Carving His Allegorical Figure of the Schuylkill River,* which is depicted as a woman. This imagery is conscious. The association of women with nature is a conscious metaphor, as well as an unconscious metaphor. Sometimes the relationship of men to women, and of machinery and technology to nature is made more explicit. This is *Persephone*. Persephone, you may remember, is one of the vegetation goddesses, the goddess of fertility, the seasons. She's lounging here under the tree, in an au naturel pose, and behind her, coming up on her, is a farmer bent on violation. The book that I took this painting out of said: "This is the depiction of a woman, Persephone, and her immediate, imminent violation by a lecherous farmer; cost of the painting, $12,800."

Here is a landscape without conscious depiction of women. This is *Fall Plowing,* painted by Grant Wood; the next, *Mother Earth Laid Bare*, painted by Alexander Hogue. It's part of a series. I think this shows you the relationship and the imagery of women and the land, pretty obviously. Sometimes this dream goes wrong.

This is *The Jealous Lover of Lone Star Valley*, painted by Thomas Hart Benton. The male figure in the back foreground, the large male figure, is holding a knife, with blood on it, the blood and the knife flow into that red on the

Mother Earth Laid Bare, Alexandre Hogue
Philbrook Art Center, Tulsa, OK

Day Shift, Francis Criss
Collection unknown

Jane Reed and Dora Hunt, Clarence Carter
Museum of Modern Art, New York

American Shrimp Girl, Philip Evergood
Hirschhorn Museum & Sculpture Garden, Washington, D.C.

All paintings used by permission.

woman's skirt. She's been stabbed in the heart. The men in the foreground continue to play music and a shell game. The little white band that's going up and around are the notes of the music. They are not paying attention to the fact that a woman is being murdered.

This sort of treatment continues in the next slide—sometimes the metaphors are urban rather than rural. As urbanization grows, and the natural environment dies, the imagery of women does not change. Women are simply transported into another setting. This painting shows a baby in the huge wall-board on the other side, this wife and husband in marital bliss on the wall. If you look closely, there are women in each of those rooms. In this one on the right, upstairs the woman is looking out at a row of trees behind her; the woman downstairs is washing her hands; the women upstairs are going to bed; the people in the downstairs are having an argument. Then if you look more closely at the painting, you realize that there are lots of fire escapes, there are lots of machines, there's a lot of metal and steel here. But there is no way out of the building. The fire escapes dead-end into dead-ended fire escapes. You can't quite see that because I didn't get it all on the slide, but there's no way out. That's by Henry Croner, the title of it is mysteriously *June Knight*.

Urbanization is another theme. This is *Automat*, by Edward Hopper, painted in 1927. It portrays women forced into an urban environment by technology, but yet separate, alone, alienated, and alienated here even from her traditional activities of being a cook.

We have here what I am coming to call *reciprocating metaphors*. The metaphors play into and off of each other, and grow, somewhat like the reciprocating gasoline engine, where the whole machine is driven by each cylinder, operating in sync, and building the power off of that work. The images are men, work, machinery, technology and violence; the reciprocating images for women are women, waiting, land, nature and beauty. Obviously the dream can go wrong; the depiction doesn't. It makes me wonder of the roles for women in the future; and I think we have three choices.

We have the choice of adapting to the technological age, using the same terms that men use to adapt to the technologial age and machinery. Here, you can see both the similarity of treatment and subject matter; social realism on one side and the idealization of women's work, the title of these are the *Turret Lathe Operator* and *Day Shift*. The latter is the only slide I found that depicts women working with the machine technology. This was painted in the 1940s. It was for the war effort, so we'll all go in there and work hard, but notice the idealization. It was painted by Francis Mann Criss.

The other options are presented in the next two slides. We may have, as you see in the painting on the right (*Jane Reed and Dora Hunt*), only the option of following after technology and picking up the coal left on the tracks, which is what this painting is about. These women follow along the railroad tracks and pick up the coal and take it home and burn it. I guess the question here is, will women have to continue to walk the rails of technology while men ride? How long will we women have to be content to pick up the leavings, the fallen coal of technology? And how long will we be expected to keep the home fires burning, through that kind of

activity?

There's a positive side, as shown in this painting by Philip Evergood, called *American Shrimp Girl*. There's a third option, and that is to reclaim and resurrect our relationship to nature, to revel and glory in it, at the same time that we try to live ecologically within it; to emulate this shrimp girl here, by living in harmony with both nature and technology.

For complete list of paintings, see page 34.

History of Women and Technology

Sue Armitage, Historian; Director of Women's Studies, Washington State University, Pullman, Washington.

I call this talk *You Can't Go Home Again*, which is meant to be a fairly blatant clue about my perspective on the history of women and technology. I've tried to be very brief in this talk; it may be that I've been too brief, that I should give more examples. However, I think the best way to regard what I say is as a beginning contribution to the discussion that began last night and that I expect will continue through the rest of the weekend.

I want to consider one part of the history of women and technology. I could have talked about exceptional women who should be acknowledged and indeed celebrated—for example, Catherine Littlefield Green, who was the inventor of the cotton gin. Because in 1793, it was inconceivable for a woman to apply for a patent, she gave her friend Eli Whitney the honor, the glory, and finally the money that went along with patenting the cotton gin. She was, in effect, penalized for the discrepancy between her own power of invention and the role of women in the period in which she lived.

But instead of focusing on exceptional women, I want to talk about Everywoman, our foremothers, whom I see primarily as sustainers. The definition of *technology* in Webster's Dictionary is, "the totality of the means employed to provide objects necessary for human sustenance and comfort." Until very recently in American history, women provided many of those objects necessary for human sustenance and comfort, namely, food and clothing. They were, as I said, sustainers. If we are looking at the question of women's role for the first time, without all of the massive doses of cultural conditioning we've had, I think that we would say that women have been the providers, because they have provided the basics, the food and clothing. Without that sustaining role of women, many men, especially, ironically, here in the male-defined West, could not have afforded to farm, ranch or mine without the work of the women in their lives. I want to play you a brief bit of oral history testimony from Ernie Betasso, who is a rancher in Sugarloaf, Colorado:[1]

> *My mother was a hard working person, good gardener, she really raised everything in the garden—she kept us all eating out of that garden, all the vegetables we needed and canned a lot of stuff. She was satisfied with that kind of a life. My wife was just like it. The woman helped the man to make things go. If it weren't for the woman, we couldn't survive on one of these mountain ranches. A lot of the women around here were about the same way.*

This sustainer or provider role is a past role for women. Although we may try, it can't be wholly recaptured, because as I will try and show you, the historical context has changed. It's my contention that without the appropriate support network, without the appropriate historical context, the redefinition of women's roles, particularly the effort to recapture a past role, cannot succeed.

But now let me look briefly at the past, the history of women as sustainers. What was the sustainer role and how has it changed? I want to give you a very brief sketch that will tell you a little bit about the experience of our foremothers.

In colonial America, from the Winter of 1620, when half of the adult women at Plymouth died, to the revolution, roughly 1776, we're talking about a subsistence agricultural economy. Men farmed, and women processed the raw material that the men grew in the fields for the use of the individual family, with only a small amount left over for resale, or commercial use. Edith Abbott, the major historian of women in colonial America, explains what women's roles were. Buried in her academic prose is a major redefinition of women's roles:

> *Such manufactures as were carried on in these early industries in colonial America, were chiefly household industries. And the work was necessarily done in the main by women. Indeed, it would not be far wrong to say that during the colonial period, agriculture was in the hands of men, and manufacturing for the most part, in the hands of women.*[2]

Women were the manufacturers when production was in the home. At the time of industrialization, and the growth of factories, around the 1830s, home production moved out of the home into factories. Poor women, working class women as we soon began to call them, moved with production into the factory, and they were the first, in America at least, to experience what we call the *double day*, that is, wage work full time in the daytime; housework and child care at night. Women who stayed behind at home, middle class housewives, were rarely the idle, genteel ladies, symbols of conspicuous consumption, the man's visible proof of wealth that we read about. Food production and processing still occurred at home, not in the factory. Clothing was still made at home. Many middle-class married women took in lodgers or ran boarding houses. Rural women raised chickens and sold eggs, or kept a cow and sold butter. The U.S. census-takers, during the last century, were directed not to record any of this female non-wage labor, because it wasn't full-time wage employment. And so the result today is that, our basic census records, which historians used to take as an article of faith, misinform us about the history of women and about their economic contributions to their families.

Here's another oral history exerpt, from a woman named Della Delimont, who now lives in Paonia, Colorado. She has described the way she kept cows and produced butter, and had a full-time job as a schoolteacher. She reflects quite daringly on her role:

> *I not only taught school here. I did everything. I've been kind of a, well I don't want to call it the breadwinner, but I've kind of grubstaked what Joe was trying to do. All the time. I really did. I really did. That's the reason why I don't feel one bit of compunction about spending all the money I want to now.*

(However, her husband is dead, so he's not there to tell her not to.)

One more point about the agricultural role of women. Dairy and egg farming, in particular, were among the first agricultural enterprises to be mechanized. Chicken keeping is no longer a female occupation; now we have massive technology that goes into the production of eggs. A similar thing happened with dairy products. Women were among the first to be forced out of a direct-producer role in agriculture.

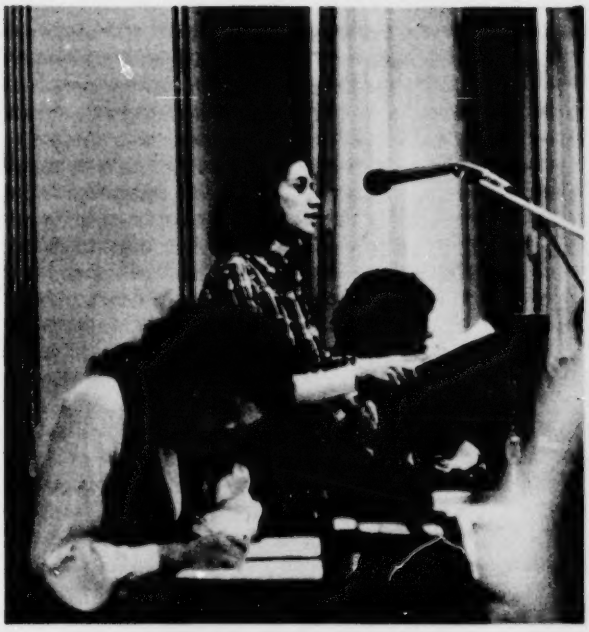
Throughout the last century, women undertook the sustainer role because they had to. Their husbands simply didn't make enough money to buy all the food and clothing a family needed. Being a sustainer was hard physical work. Here's another reminiscence from Maudie Wagner, of Sugarloaf, Colorado:

> *You talk about the 'good old days,' but they weren't good, it was hard work. It was really hard work.*
>
> *—But you lived through it?*
>
> *We lived through it. We washed clothes on the board. It was hard work, everything you tried to do, was hard work. Of course, you never had heat like this—you always had to get up in the morning, it was cold, build a fire, to get warm.*

Beginning about 1920, but not reaching all women until about 1945 (and in some places even later), the nature of housework changed, and the nature of the sustaining role changed, partly because of technology. First, there was the commercialization of food, and the growth of national distribution systems for food. On a more immediate level, affecting individual women, household appliances and other technologies appeared. The small electric motor, used in vacuum cleaners, washing machines, refrigerators and even smaller motors, in toasters, in electric stoves, for example, took the physical labor out of housework. But, these appliances were not liberating. A few years ago, an article

appeared in *Scientific American*, by Joan Vanek, which came as a stunning surprise. It showed that full-time housewives, in the late 1960s, spent 56 hours a week on housework, as much time as their mothers had spent on housework in the 1920s.[3] Remember that the mothers had not so-called "time-saving" or "labor-saving" appliances. Vanek's explanation, that housewives today spent many extra hours just to convince others that their job was important, was notably unconvincing. A much better explanation is that this new technology, in the hands of advertising, was certain to reinforce the traditional, female domestic role, unless new social roles for women were simultaneously invented and insisted upon. Those new social roles for women did not begin to emerge in a significant way until the late 1960s.

The moral of this very brief survey of history is, I hope, evident. Without technology, women were unliberated, in the sense that they were engaged in domestic chores that were both hard physical labor and took practically all the time there was. But with technology, women are still unliberated, until we take the next step, creating and supporting new social, economic, political and public roles for women, replacing the constricting, privatized housewife role, which still, as a ghost from the pretechnological past, confronts women today. We must all work on this redefinition, because the history of women and technology makes it very clear that the redefinition won't happen by itself.



l to r: Coppinger, Zimmerman, Bush

Women's Need for High Technology

Jan Zimmerman, Media and communications consultant, Los Angeles; Former Project Director, National Women's Agenda Satellite Project.

I have been working for the last five years on developing an advanced telecommunication system that would be cost-accessible to the public. What that means is, taking technology currently used by large multi-national corporations and locating something in this technology that can be used by ordinary people in their ordinary lives, that can make our lives easier, that can make it easier for us as women to be in touch with each other, that can make it easier for people working on community development and social change to be in touch with each other, that can make it easier for people involved in health care issues, labor issues, to be in touch with each other. It also means that there's something about the design of that technology, the way in which it's implemented, and the people who are doing the implementation, that is keeping us from having access to this system. I've worked on the development of teletype networks for alternative news services, and on the development of computer cooperatives, in which a number of public-sector organizations share both physical space and the cost of software programming and timesharing. There is a large scale telecommunications cooperative underway which would bulk-buy telephone lines from Western Union for sharing among nonprofit organizations, so that everybody could have access to a watts line.

The most sophisticated of the systems that I've tried to gain access to was that of satellite communications. The National Women's Agenda, from 1977 to 1978, along with a number of other social service organizations, attempted to utilize a satellite which is owned jointly by the U.S. and Canada, the communications technology satellite, supposedly designed to provide social services, and for public sector experimentation. The Agenda's goal was to link over a hundred women's organizations, which were its members. The Agenda itself had chapters in six cities: Chicago, New York, Washington, Houston, Los Angeles and San Francisco, for the purposes of "narrow band" information transmission, that is, everything except television. We wanted to do audio-teleconferencing; we wanted to establish a nation-

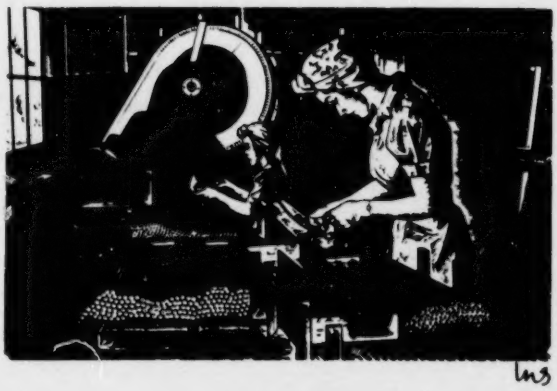
wide news service and a legislative hotline; we wanted to be able to do facsimile transmission. We wanted to be able to have a nationwide computer databank for women. These were all admirable goals; and I will return to the story of what happened, since the project no longer is in existence, in a few minutes.

What I want to talk about in the first part of this speech is to explain why I think the social structure kept that project from existing. I'm here to talk about women having power over high technology, and why it's going to be essential, not just for women, but for all of us as individuals, to be monitoring and moving into strategic places in technological policy planning. If we don't, we're going to continue to be planned out in a way that is very, very frightening.

When NASA was asked what they had done for women in a survey by the National Women's Political Caucus, in 1976, they considered it, and they said, "Tang, teflon, and a better refrigerator door." I think that says more than any thing else exactly what's going to happen to women with technology if we aren't in there defining what it is we need. It's going to be an enormous struggle to control technology. We need to decide what definitions of technology will work for women. I think Judy said one of them last night: when we define technology, whether we're looking at appropriate technology, alternative technology, high technology—one of the things that has to be considered is, what is it going to do in terms of sex-role stereotyping? The other thing that we have to look at is, what is it doing to expand woman's control over her own life? In our society, control over our own lives is primarily determined by economic power. When Jimmy Carter fired Bella Abzug, he did it for one important reason: Bella kept saying, "Wait a minute, the economy is a woman's issue." And Jimmy Carter kept saying, "Childcare is a woman's issue, not the economy. You can have your health care, you can have your childcare, you can have your six nontraditional jobs; but it you want to start talking about controlling the economy, goodbye." The fact of the matter is that jobs are a woman's issue, because poverty is a woman's issue. And poverty is partially a woman's issue because technology needs to become a woman's issue. Women are consistently located on the bottom of the technological scale, the bottom of the job scale, and until we get control of that technology, and look at how the workplace can be reorganized, we're not going to reorganize women's roles and women's place in this society.

In the economy, women have historically had three functions. Their first function was that of unpaid labor: home care, childrearing, women's responsibilities are unpaid labor in our society. We have a second function in the labor market: the surplus and transient labor market. Women came in during World War II to replace men as they went off to war. When women are no longer needed in the workplace, they are sent back home again. If you start watching carefully what's going on with ads, as we move into this period of economic recession, you might get a little bit frightened, reasonably so, at the reassertion of women's traditional role and the articles that start to appear about women wanting traditional marriage, women going back to having kids, women wanting to be baking bread again. There are reasons those articles are appearing. I don't want to put down those roles—every woman and every man has the right to use whatever roles give them personal fulfillment. But when traditional roles start getting out in the media, part of the reason is to recreate the myth that that's the place where women belong.

The third function that women have served, and one of the reasons that they've needed to be maintained as both unpaid labor and as surplus labor, is that their function in the economy is to be consumers. The more our economy has grown, the more it has become a consumer economy, the more we have needed somebody out there spending all that disposable income on the incredible growth in consumer products. One of the primary expansions of women's role has been in the time spent shopping. We spend much more time now marketing and shopping, than we ever did before, in spite of all the consumer malls that should make one-stop shopping possible. We can't very well take all of those people away from doing their proper job of keeping money circulating in our economy by putting them to work!



One of the things that we need to consider here is the fact that neither appropriate technology nor high technology, as I see it right now, is going to change any one of those three options sufficiently. Unless women gain control over technology and its development in all forms, we are going to continue to be unpaid labor, and to have a great deal of role division in childrearing and homecare. We've got to find ways to spread those roles out, either in terms of sharing them with men, or in terms of making them roles that are handled by society as a whole—that means, paid 24 hour childcare, laundry and foodservice that occurs outside the home. These responsibilities must become something that's accepted as part of the function of society, and not required of the individual family unit. To have equal participation in the economic structure, we have to move away from this surplus labor function; and that's not happening.

The third thing that we're going to need to do is to move toward control of information and communication technology. Images that come via the media, in advertising, have become the primary method of cultural definition. Many people get their images of women from television. We need to keep in mind that we're in a place where we may be easily fooled. There's an enormous temptation, both

with modern technology, and with appropriate technology, to have the illusion of getting our control back. The idea of going back-to-the-land and confronting survival issues, or of our having options as individual consumers, is a myth. We are being sold a myth, that somehow, if we go home and cultivate our gardens, the system will change. There's no one who would be happier than the stockholders of the multinationals if we all would just go home and cultivate our gardens. And the same thing is true with high technology. NASA tried to show that there really were new options for women in space technology at the IWY Conference in Houston. There you could pose in a space suit helmet, and have your picture taken. However, women are not running the space program, even if they are allowed to fly as flight attendants.

Arthur Schlesinger noted that *power* is control of the means of communication. For those who doubt it, I would suggest that you take a look at what has happened in Iran. In any insurgent culture, the first thing that's taken over is the radio and television stations. Not surprisingly, as the women began to protest in Iran, the news media in Iran refused to cover it. They attempted to censor American newscasts showing women protesting. What do I mean by *sources of power?* I'm talking about satellite communications, direct satellite-to-home communications. I'm talking about having multi-beam satellites that could provide 90 channels of communications, that could be picked up on your home television set, through an antenna approximately 14 in. in diameter. Reception would not be stopped by the tallest mountain. This will mean the replacement of what is, at this point, a regressive technology of copper wire, with something called *optical fibre*, which has a capacity of carrying 80 channels direct to your home. Those of you who have cable television, with optical fibre, you could multiply by 20 the number of channels you could receive. I'm also talking about linking up computer systems, and electronic mail, over which the postal service is currently fighting with private suppliers. The intended market for that service isn't those of us who may need to get an immediate message to a legislator or a lobbyist in Washington, D.C. Their idea is that it will cut down on the cost of billing for large corporations. I'm talking about being able to have, in combination with touch-tone telephone systems, and centralized computers, the contents of the public library available to you in your home. I'm talking about shopping from your house, banking from the house, by picking up the telephone, pushing a few buttons.

What's going to happen when we take these systems and put them into our lives? Whether we want them or not, they are going to be put there. We don't have a lot of choices about that, just like we didn't have a lot of choices about credit cards. These systems are in place, and they're what's going to happen in the next 20 years. Let me just sketch a few ideas of what could occur.

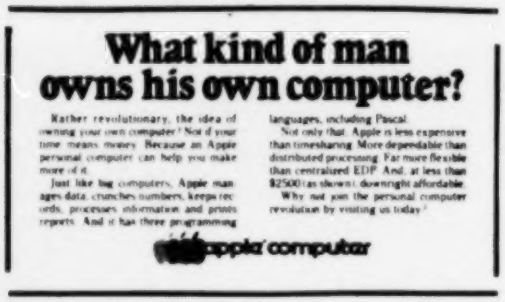
One thing that is going to occur, and is going to be encouraged by the energy crisis, is the substitution of telecommunications for transportation. A great deal of what is now done as office work could be done at home, by a home computer system. This could mean an incredible change in the nature of work. It could mean a lot of good things. Some of these things that are already happening, in the sense of shorter work weeks. It's also going to mean that it will be possible for both men and women to stay at home and work, which will mean that there are possibilities that do not now exist for shared childrearing responsibilities. As the work gets shorter, as leisure time increases, the excuses for division of labor that have been used in the past are going to fade.

Another thing that could happen with the growth of leisure time is the accelerated development of the pace of social change. If you look at the suffragist movement, or abolitionist movement, or any revolutionary movement, the thrust for social change has come from those with the time, energy, and money to be able to work for it. People involved with survival are not going to be out there doing social change.

What could happen in terms of surplus labor, from Sue's picture of women doing dairy and egg farming being the first thing that was mechanized? Women are now being tracked into the equivalent, they're being tracked into keypunch, into computer programming, when system analysis is going to be where it's at. All you have to do to figure out which job is going to disappear off the labor market is to see where women are being put.

A perfect example of this is a current IBM commerical on the history of typewriting. You may know that when the typewriter first came out, it was considered a mechanical device far too complicated for women to use. Private

secretaries had always been men, and men only were allowed access to the typewriter. Men quickly realized that it was very boring to be a typist, and soon allowed women to type. Men became administrative assistants, and executive directors, while women were allowed to type. This IBM commercial starts out with the male secretary; moves to the male at the typewriter, to the female at the typewriter; to the female at a series of increasingly sophisticated typewriters; from one female in the office to six females in the office. All typing, madly typing. Then comes viadeck, the word processing machine. What does this do? It cuts business cost by one-sixth, and replaces the six women with one man running the word processor and the magnacard typewriter.


What kind of man owns his own computer?
Rather revolutionary, the idea of owning your own computer? Not if your time means money. Because an Apple personal computer can help you make more of it.
Just like big computers, Apple manages data, crunches numbers, keeps records, processes information and prints reports. And it has three programming languages, including Pascal.
Not only that. Apple is less expensive than timesharing. More dependable than distributed processing. Far more flexible than centralized EDP. And, at less than $2500 (as shown), downright affordable.
Why not join the personal computer revolution by visiting us today?
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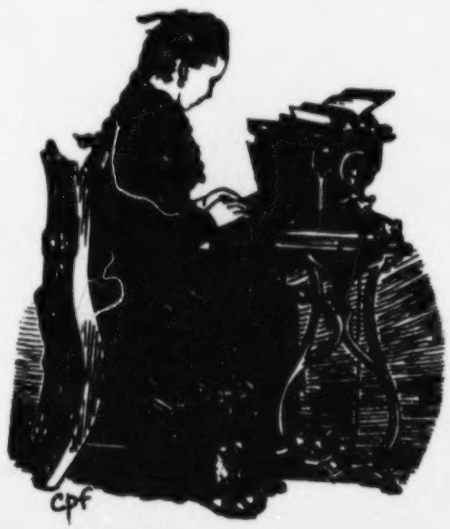
What effect will this new technology have on consumerism? What about the media and computers? We already have computer appliances in our homes: in video games, in home calculators, in microwave ovens that are touch-dial, in telephones. The home mini-computer, now available for $600 or less, is going to move in. I talk about this as if we don't have options, because I really believe we don't. This technology is here, and we're either going to have to learn how to control it, or it's going to take us over. Let me give an example of what I'm saying in terms of consumerism. I spoke earlier about optical fibre, a television cable that can carry 80 channels. What that can mean is very specific demographic marketing. Most of you are familiar with that fact that the real function you serve for television broadcasters is that of being their product. You are what they sell to the advertisers—they sell their viewers. This means a cable company could do very specified demographics. An analogy would be a special interest magazine: if you're a builder of solar energy devices, or a motorcycle fan, there's a magazine which will meet your needs. Special interests could be sold via cable the same way. You would fill out an interest card upon subscribing to your cable television, giving the ages and interests of everyone in the household, and you would get commercials specifically designated for your needs. Eighty channels! You know, next door they could have a different commercial. Another thing that this may mean, if you really want to imagine 1984, is that we could all get different news; none of us would know if we were looking at the same world. As it is now, we only have a guess—we can't really be sure. This kind of fragmentation makes social change impossible: you say, "There are no jobs for women," and your neighbor says, "What do you mean, everyone is employed, there is no unemployment for women." This sounds like a fantasy; but if you realize that they didn't start getting honest with the news after the war in Viet Nam, you know that there's no reason to expect that this is not a possible vision. They've got to sell their product; and if it helps not to upset people with the news they receive, you will sell more cereal.

But for Montana, with this kind of communications, you could put an end to the isolation and fragmentation that inhibits social change. I've heard a great deal from women about the difficulty in doing rural organizing here. I'm not saying that we should replace human contact with communications; I'm saying that there's something really important that could happen here, in the winter, with satellites; that would happen cheaply, via two-way communications, by taking that same exact system and having control over it. The technique exists. It's called *thin-root communications*. It's being used for satellite communications in places all over the world. For example, Indonesia bought a satellite from Hughes, who was trying to unload an extra one that they hadn't been able to sell to NASA. Indonesia is a system of islands that are not connected by any form of wire communications, even for emergency situations. So what do they do with their satellite? They place the satellite dishes on the islands which are being mined by multinational corporations, so that the multinational headquarters can receive constant data on resources available and potential dates for the development and shipping of those resources. There's no attempt to provide any services to populations on the scattered islands in Indonesia.

What I'm saying with stories like this is that I think we are up against the wall. Taking control of high technology is not going to be easy, and the story I want to tell next will prove it.



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So what happened with the satellite and the National Women's Agenda? A demonstration was scheduled for the National Women's Agenda Conference. We were going to hook up San Francisco and Washington, D.C. to the satellite experiment. Being good planners, being conscientious, and wanting to be sure that we were not going to be held up because of our lack of knowledge or information, we started the planning process six months ahead. We had quite a few very skilled women working on this project: computer engineers, satellite engineers. We had combed the country, had found them; they were women, and they were very, very competent. We had a contract with the organization that provided technical services for public service users on the communication technology satellite. Then we started to run into some funny delays. Suddenly the time which had been approved got unapproved; things we had been told could be done couldn't be done; they didn't think their equipment could handle our program because it was too innovative. Well, we had a conference scheduled, and we had to have the guarantee from NASA we were going to have the conference in order to get the money to rent the facilities, and to present the program we were planning with the satellite. Then came a telephone call: what are you planning to talk about on this satellite? I answered, "Issues of concern to women." "What kind of issues?" I said, "All issues." They said, "Well, we don't know about that. You really want to talk about all issues?"

and I said, "I can't tell you what's going to come up at the conference." They said, "Do you know the rules for satellite usage?" and I said, "Yes, the rules are, there can be no fundraising, and no political campaigning. We're not going to do fundraising, and we're not going to do political campaigning." They said, "Well, you should understand something. Your lives as experimenters are going to be very short if you discuss lesbianism and abortion." I said, "Is this a threat?" They said, "No, just a warning." Well, that year, there was an ERA fight going on, and we did not have the money to fight the issue through the courts. This was a month before the conference. It became very clear that what had actually happened is that the engineers at NASA-Lewis Research Laboratory in Ohio had literally refused to plug us in. And rather than say to the engineers, "Hey, that's your job, buddy," they said to us: "No lesbianism, no abortion, or no satellite." Once again, it was the phenomena of blaming the victim. This was a very important lesson; what it meant was no matter what the technology, the values are the same, and we're going to have to be prepared to do battle.

For what it's worth, just as a brief footnote, there were some successes won. We all got communicator certificates for one thing, that read, "Be it known by all men present."

The Public Interest Satellite Association won some of its victories. There have been major design changes in the public service communication satellite; they have won major changes in the position of the U.S. in the World Administrative Radio Conference. To know how they did that, you should know that they found a very wealthy patron who sublet Livingston Biddle's apartment in the Watergate, and they started entertaining southern Senators in style. That's how you win in Washington.

Let me just sum up what I think high technology means for women. The first thing it means, is that if we thought there was going to be some way to find a personal answer to a political problem, technology is not it. There are no personal solutions to the problems with high technology. They are going to have to be solved by people working together, by trying to find the appropriate focus of blame, and that doesn't mean blaming each other. It means that we're going to have to continue to fight, it means that we're going to have to continue to educate ourselves in the language of science and technology. In 1957 Sputnik went up, but all of the women were left out of that math and science revolution that hit the public schools. It means we're going to have to support women who want to work in high technology areas, and end their isolation and their battle.

I don't know how to tell you how many really shattered women out of Aerospace sent me resumes as news got out about the satellite project, that said, "I'll do anything to be working with women."

I think that there are two myths that we have to be aware of and to fight. One is the myth of technological determinism: an implicit technological rationale that says that this is what the technology has to do. However, technology is controlled by politics. As Jacques Ellul would put it, "a civilization in quest of continually improved means to carelessly examined ends." Unless we plant ourselves very squarely in the path of technological determinism in the same way protestors in New York put themselves on the runway in front of the Concorde, there's not going to be an end. This kind of battle will be required. We can't just send someone off to Washington, we need people behind to change things. And there's a concomitant myth, and it's a dangerous one, that substitutes the word *ecological* for *technological*, a myth that we can easily fall into again; that's the myth of ecological determinism. We do have limited resources in this country. But that does not mean that women, who have always done without, are going to have to take the biggest sacrifice. And as you leave this conference, I would have you think about that. Who's being asked to do the giving up?

Women and Appropriate Technology

Elizabeth Coppinger, Ecotope, Seattle, Washington; Manager of research project on methane production.

The main thing that I want to deal with on the subject of appropriate technology is the word *appropriate*. Appropriate technology deals with issues of local control; what is appropriate differs from region to region, from community to community, and from individual to individual. What appropriate technology is working for is to allow people and communities to have the power to decide what is appropriate for them. Appropriate technology promotes energy conservation and the use of renewable resources; local food production, so we're not dependent on transportation from California to feed us; local economic control, which I think is pretty apparent in a state like Montana, incredibly resource-rich, and yet the profits go out-of-state. Appropriate means being able to make decisions about how you want your community to grow, deciding what is appropriate work, what is a good workplace, what are really meaningful jobs. Since it deals specifically with questions of power and control, giving power to oppressed groups, including women, is a central issue within appropriate technology, because in order to be truly appropriate, something must be appropriate for everyone, not just for white males. If it's not appropriate for women, it's not appropriate. If it's not appropriate for poor people, for minorities, it's not appropriate, it's simply passing the oppression on from one group to another.

I'd like to say a few things about what appropriate technology is not. First of all, appropriate technology is not synonymous with "back-to-the-land." Appropriate technology promotes moving forward, rationally and sensibly, using the resources that we have available; not giving up technology, but using it intelligently and appropriately. Back-to-the-land is not an answer that's appropriate to very many people. If you're a poor person in the city, you cannot go out and buy a piece of land and learn how to subsist. Anyone who has tried to buy land, and to capitalize the kind of equipment that is needed to make it pay, knows that it is appropriate for very few people. In addition, this kind of rural solution is not appropriate for our urban-based society. A very good example of an appropriate technology group is the East Eleventh Street Co-op in New York City, where a very poor neighborhood of Puerto Ricans have taken ownership of buildings, and renovated. They then own their own homes, and the money that they pay goes into a co-operative to pay for bookkeepers and maintenance. They're creating jobs in their communities, they're promoting their own culture. They're keeping a strong sense of community and identity in a city that works very hard to destroy that.

Appropriate technology is not energy-fascism. It won't come into your home and take away your microwave oven. It won't remove synthetic fabrics from the market, and say, this is not politically appropriate.

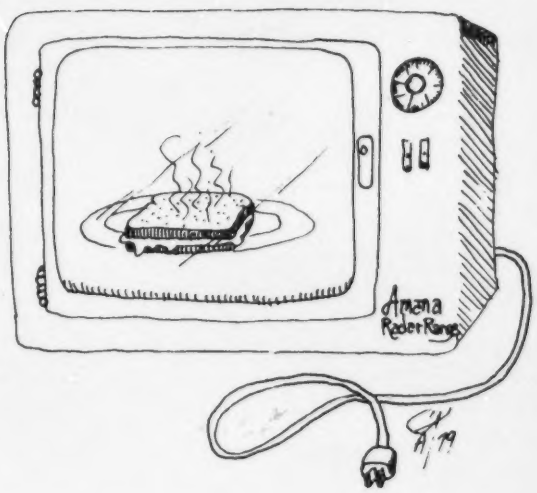
Our society is definitely consumer-based. This consumerism, which has promoted single-family dwellings, has resulted in isolation. And in that sense people have become powerless. You can't get together as a community and try to take action if you're kept isolated from everyone else in your community, in your own little box with all your own little appliances. Women have by far been the ones who have been the most isolated and kept the most powerless. I appreciated Sue's point about women in the home spending as much time now with labor saving devices as they used to when they didn't have labor saving devices; I think one of the reasons for this is that we've been sold a bill of goods by the media. You don't have to chop wood for your wood stove now, but you have to keep your furniture shining so much that you can see yourself in it, you have to keep your dishes spotless, and you have to cook three meals a day.

Dealing with the issues of women in the home in terms of time-saving devices really ignores the question of men's roles in the home, which is a very crucial issue. Why is the home defined as a woman's domain? Why do we assume that if labor-saving devices are removed, woman's labor is going to replace them? A lot of women feel a great deal of skepticism about whether men would be willing to put more time into the home if there weren't labor saving devices. Relying on convenience devices ignores the root question of women's oppression. Of course men don't want to work in the home. But we're at a point where they have no choice. It's going to be hard, I'm sure.

People often equate appropriate technology with a drop in lifestyle. This really depends on what your definition is of a "high quality life." Up to this point we've been told that high quality of life is having the ability to consume. I believe that the quality of life is much more than that. It's not just the physical trappings, it's having a sense of community, a real feeling of individual control over your life; feeling that you're engaged in meaningful work, that you belong, and that you have the ability to accomplish goals, both individually and for your community. Working toward a decentralized society where people have local control is going to take a long time. We need to start making decisions, start controlling the way in which our society is developing. It's essential that women be involved, actually taking part in decisions.

The idea that appropriate technology is good for women because you don't need a lot of training for it, or you don't need a math background for it, you can cook in your solar oven, is absurd. It ignores two central questions. First, the question of women's power. The second one, what are the long range issues of appropriate technology? If you have a very energy conserving home, that helps a small part of the energy problem; but there's a much larger one, for instance, what's Montana Power doing? What are their policies in terms of renewable energy sources? What does their money go into? What are the profits going to? Women shouldn't be being thankful that appropriate technology is giving them a break, letting them use solar ovens. They should be on the board of Montana Power, deciding what Montana Power is doing.

In this country, whoever controls technology essentially controls the society. We can move in the direction that we are now, which is toward more centralization, more high technology; or people can start to work with appropriate technology, toward more decentralized ways of living. Whichever way this country goes, unless women start taking power, they're going to be left out. At this point there are more men involved in



appropriate technology than there are women. In our organization, I personally do as much as I can to try to involve women, because I think that the appropriate technology movement offers some hope. I think that the role of women in appropriate technology is very important, since it's a new activity, and an area that doesn't have a lot of the ingrained prejudices that multinational corporations do, where for instance, men are always at the top. Experts in appropriate technology have usually been involved in it for 5-6 years. That's not a long backlog of expertise; it would be very easy for women to acquire all the knowledge and skills that they need to reach the forefront of appropriate technology. I think that we have a lot to give in terms of our perspective; we also bring an incredible amount of strength.

Conference Synthesis

Sally Hacker, Louise Hale, John Badgley, Ann German

Saturday evening's panel members were invited to attend the Conference, observe panels and workshops, and listen to participants' comments and reactions. Adding their own experiences and thoughts, they were asked to present a synthesis of what appropriate *could mean in terms of women and technology.*

Sally Hacker, sociologist, Oregon State University, Corvallis, Oregon; participated in race and sex discrimination study for AT&T; while studying women and technology, she studied teachers of technology and agribusiness at MIT.

What I'm going to do is tie together the themes, introduced by the presentation last night and the panel discussion this morning, and what I've been able to pick up from workshops today, with some work I've been doing myself. One important theme, which people have mentioned, turns on the connection between technology and women's work. Does it eliminate women's work? Does it create more work or make our housework easier? I want to share with you what we have just found from three years study at AT & T, the telephone company, the largest employer of women in the country, the largest private employer of people in the world. We fought for affirmative action legislation; when we finally got the legislation, we found it had no teeth. Then we put teeth into it, and have tried to see it enforced ever since. Finally we got the legislation in shape we thought would work, and after 3 years, the company faced a fairly serious lawsuit. We claimed 4 billion dollars owed to women in back pay; facing fairly serious court action, they settled out of court for a paltry $36 million.

Let me tell you some of the other results. Three years after that settlement, we found that despite the strongest of all affirmative action legislation, there were 22,000 fewer women employed than there were at the beginning of that program. Largely due to technological change, elimination of jobs as operators and as lower-level clerical workers, men gained 13,000 jobs during that time. Moving to a more sophisticated, higher level of technology opened up 9,000 nontraditional jobs for women; but it put 16,000 men into women's jobs. So affirmative action, despite the myth, has opened up many more women's jobs for men than it has opened up men's jobs for women. Furthermore, we found that in the move to higher technology, the very jobs into which women are being encouraged, higher level craft jobs, are those which have been slated for automation. We either have the techniques now to fully automate those jobs, or to automate them very soon. As women learn to climb poles, we'll be moving to different kinds of transmission systems, microwave and so on; as women learn to install telephones, we'll be moving to phone stores. So what we have found in this study, and in a study of several other industries, is a progression of workers through jobs toward automation, from fairly sophisticated craft work; breaking down of that craft work, into more routine, mundane, repetitive work; minority men will move in after white men, then women move in, and then machines. Unions were not much help to women during this period. Eighty thousand jobs went down the drain, and the union didn't move until automation started affecting male craft jobs. I found out from reading history in the library at Harvard, how plans had been underway since the late 1950s to move women into craft jobs which would then be eliminated afterwards.

This morning, Sue was talking about research indicating that it doesn't take much less time to do housework now than it did before all these domestic appliances. Chris Bose has an interesting piece of research indicating some of the reasons why the more appliances we have, the more time we spend isolated in our kitchens.[4] Buying the appliances, cleaning them, repairing them, waiting for somebody to repair them, all this takes time. In fact men are spending less time helping with the housework than before domestic appliances. For example, the introduction of the garbage disposal has meant that women are now carrying out the garbage instead of the children or the husband. The introduction of the dishwasher also means that there's less help with washing dishes. This kind of technology is not helping us out much at all.

A suggestion I have is to organize, with other women, support groups, and working groups that can support each other, whether it's a research collective, living collective, or a union. These separate women's groups are what we need to shift our perceptions, get our strengths together, be able to operate from a position of strength, and do some conceptualizing on our own. If it's women in rural areas, on farms, in scientific professions, in alternative technology—I think it is important not to listen to the argument that this is separatism. There are already existing structures for men to get together, called Congress, corporate leadership, church hierarchy, male-only clubs.

I want to finish the second theme that has emerged, and that is the association of women with nature, men with machines; men with mind, reason, rationality, and women with emotion, sexuality, and nature. I was working in Iowa for a while, and found engineering publications sprinkled with pictures of women draped over pieces of machinery. There was one publication called *Iowa Engineer*, and on the front page was a statement of engineering ethics, which was very moral; on the inside there was a centerfold of the "E girl of the month," one of the secretaries sitting on a filing cabinet in her miniskirt. At engineering conventions, I would find women in bunny suits advertising devices; a man demonstrating the metric system with a tape measure and a woman in a bunny suit. It was incredible; women were continually portrayed as dumb and sexy.

As a way of doing research, I sat in on various agribusiness courses for 3 months, and heard how women were described. Every time the professor made a joke about his wife, or put down a woman, or made a sexist comment, I lost about three minutes of information. Then when I came back, everybody else was about three minutes ahead of me, because I was trying to figure out, what did he mean by that?

The role for women in agriculture is to be volunteer support services. Women are supposed to promote beef legislation, they're supposed to argue against boycotts. The farm woman, who is hardy, tough and resilient, was constantly contrasted with the silly urban woman consumer, and yet it's agribusiness that's transforming the farm woman into that silly urban housewife, who exercises decision-making at the supermarket.

Women are still consumers, but they need guidance. "That the housewife sets the pace is the biggest fallacy yet. She doesn't know the difference between cuts of meat. She can't tell by looking. She's not educated enough to know." Or, "Most housewives can't tell beans from apple butter. They need meat specialists to tell them what the cuts are. Meat merchandising could be a job for any man in this room." And then he looked up and caught my eye and said, "Oh, that goes for you gals, too." Stripping even the kind of decision-making that women make in their consumer role is important.

I looked around at the plants and the factories where women were working, deboning, or printing and publishing. Taking tours is a good way to find out what the opinions of men are in these managerial positions about the role of women. They said, "This is boring, routine, detail work. Men wouldn't sit still for it. That's why we hire girls." I looked around at the "girls," who were all women in middle age. "People won't take these jobs," said the manager in a poultry plant, "but women migrants will." "Farm women work out best in deboning, because farm men are accustomed to greater freedom of movement. Men go into beef, women go into poultry. You can control them a little better." In telephone company job descriptions, women work close to the desk, under close supervision, write in small spaces. Male jobs are similar, except they have the freedom to roam around. So again you've got this tight, tight control of women. Put tight control together with the association of women with sexuality and nature; control of people who are considered dumb and sexy is not so surprising. With the technical, scientific man representing mind and machine, and woman on the other hand representing nature and sexuality, the object to be controlled, what in the world does that do to the young man?

I found, for example, that young fellows going through that kind of training tended to refer to their own bodies as machines; they talk about "going in for a retooling, going in to get gassed up, going in to get their carburetors fixed," instead of going in to the shrink. Contrast this with women, who tend to use organic metaphors like "cross fertilization," or "planting a seed in someone's mind and watching it grow." One agriculture industry expert referred to people as "meat machines"; you know, we can program a computer to do almost anything a human can, and besides, people are only meat machines, things that work like machines with a little meat around them.

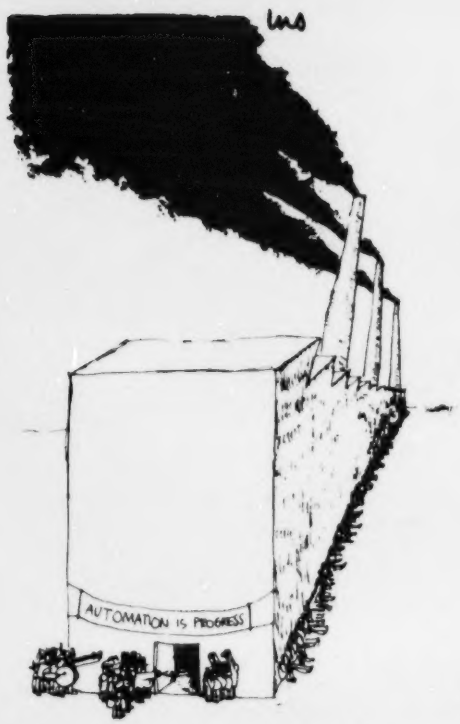
As a sociologist I was curious; how do people get this way? So I interviewed a fairly large sample of the engineering faculty, and for comparison, a group of men in the humanities. With this contrast, I thought I could separate out what was male and what was technical. But the responses were incredibly similar. I asked questions like: in childhood, were they intimate in family or friendships? They answered: "Close, within reason." "I've never been dependent on people in an emotional sense. I could be quite happy on a desert island." "Social, but not close on the level of emotion or feelings."

"It's hard to remember; I didn't have personal feelings as a child." Most men even now seem to be able to form warm relationships without becoming especially intimate.

Their interest in the scientific and technical tended to isolate these young boys. I asked, "What did you think about girls at that age?" Most of them grew up in all male play groups, went to all male schools, and then ended up teaching for all practical purposes, in all male colleges. Their answers: "Well, what about them?" "Well, did you play with them?" "No. They weren't my ball of wax." Or, "I didn't think about them very much." One said, "Damn, let's see, I like them, I guess."

They went on to talk about their own physical experiences. What does this notion of the separation of mind and body mean for the male experience? Most of the people I talked to were very attractive, very robust, very healthy, but without exception mentioned some kind of feeling of insecurity in childhood, particularly in athletics. Their comments were: "It was painful; I was never very good." "My father was disappointed; I was really awful." I asked about their sensual experiences, the play of sunlight on landscape, or rhythmic music, or colored lights, or special textures; about half the people said they recalled no such pleasure, that these were unmanly, their wife's concerns, probably abnormal for men. I was also curious about this connection between nature and woman, so I asked, "Why do you think people associate women with nature?" I'd read a few quotes from Bacon about "pursuing nature in her secret path," and "stripping off the veil of nature," and things of that sort. The response was consistent. "Women are associated with nature, because of the whole cycle of having periods. Childbearing." "It's a little more obviously relevant to nature than to man. Nature is growth and reproduction, earth, fertility, childbirth, the earth gives plants as a woman gives children, it's a very basic and primitive image." "People's interpretation of nature emotionally is out of my field, the hard side of nature is my business." "Women and nature look nice."

I have some notes here from the Renaissance, which we consider the pinnacle of cultural humanism, looking through this very important book by Susan Griffin, *Woman and Nature*.[5] When she talks about the Renaissance, about many important scientific discoveries, she intersperses them with what was happening to women at the time. "Treatise on the Proportion of Velocities in Moving Bodies, The mathematical law of dynamics, published 1382. In 1431: Jeanne D'arc, age 22, placed high on the fire so the flames would reach her slowly, dies. 1468: the Pope defines witchcraft, removing all legal limits to torture. 1482: Leonardo Da Vinci moves to Milan. 1523: 1,000 witches burned in a single year. 1603: William Harvey assists at the examination of witches. Galileo constructs



the telescope in 1609. 1609: the whole population of Navarre is declared witches. "This is what we consider one of our prominent periods in history. Why weren't folks protesting at that time? Mary Daly, in *Gyn/Ecology*, which is another very important book, talks about what was happening to strong, tough, independent women, who were largely doing healing, and were leaders in a peasant population.[6] Why were Bacon and Descartes silent in the face of this massacre of women at the time? Daly quotes one modern writer who answers, "Why should they court trouble on a secondary, peripheral issue?" Women are secondary. This is the sort of thing that can happen in periods of significant transformations in the social order. If we're at that point, right now, I don't know.

Daly also describes another problem, that is, "masculinized humanism". There is a tendency to leap from feminism to humanism, before we've done anything about the difference in power between men and women. For example, Daly describes the male gurus, the people who use poetry for attack; she calls them "smothering mother *men*," people who would deny feminism, in the leap to humanism. I think we see some of these problems around us at the moment, in many different fields; if we don't see women sharing conceptualizing, defining problems, how are we going to deal with these problems?

Louise Hale, Sociologist, Montana State University, Bozeman, Montana. Macrotheorist and feminist.

What I'm going to talk about are some very general issues, which are organized around questions of social change, social policy. The first thing I want to do is to distinguish between social policy, that is looking at patterns of organization as a policy, which although it may be unconscious in the minds of individuals, and perhaps unintentional, unplanned, nonetheless constitutes the policy around which social organization occurs. Societal policy actually is another way of referring to our culture, ideology, or the pattern of values and beliefs, the idea system which is a basic sense-making and guide for social action, either individually or in terms of the organization of central society. In the U.S., which is typical of most industrial societies, the culture, or societal policy,if you like, emphasizes a few central aspects of life, and thus sets a few central goals, for society as a whole, and for individuals. Most industrial cultures emphasize materialism. That includes technological mastery of the physical environment. Most industrial cultures also emphasize private accumulation, and the marketplace, the central social sector. All of these have become identified historically with male activity and male self-identity.

If we take this as an overview, it in turn points to the relationship of three themes that have come up several times during the weekend. The question of social rewards: what are we doing this for? What is our activity aimed at? Generally speaking, you could call social rewards *power*. We've been talking about that. Central social activity is activity in the market place. We've been looking at paid work, that is, valuable work, which leads to social rewards, which is in fact economic activity in the market place, thus defining work as formal economic activity and excluding most of women's work. The other theme is the idea of self-identity, which includes questions of social competence, individual competence; the other way of looking at that is feelings of incompetence, like math anxiety. The motivation to enact social roles. Why do we go ahead and do these things? Why do 30 million people actually get up and report to work at 8:00 every morning? It's an enormous phenomenon. Economic need, or the creation of false need, is part of the individual who is a member of the society, who has internalized the culture, the system of ideas, which I'm going to refer to as societal policy.

Social policy also occurs in the same pattern and context. In other words, we don't think of goals; we don't organize social activity to effect change. Social policy is best defined as *public policy*, in which goals or guidelines are established by a formal agent of the polity, from the government. One very clear indication of the way in which social policy is indeed patterned by culture is the tendency for social policy to be economic policy. Everything from Keynesian economics to affirmative action legislation tends to reflect the centrality of the economic sector in our culture, and thus the intention of social policy, to make significant changes by manipulating the significant sector for social action, our economic lives. In a sense, this predefines the exclusion of really effective social policy aimed toward women, because women are by definition and by fact excluded from major activity, in this central cultural sector: economic life, the market place.

We could also talk, of course, about planned change social policy vs. unplanned change or societal policy. This could also be called planned stability vs. unplanned change. Because, in effect, most of the social policy that we deal with, which guides our activities is social policy aimed at maintaining the system that exists, rather than altering it in any significant way. One further thing that's important to note: if you talk about societal policy and social policy, it should be clear, that the nature of the value system is such that in addition to the direction of unplanned cultural change, the direction of social policy, is in part determined, by a third factor, and that is corporate policy. It's not formal social policy, in that it doesn't represent the polity; it's certainly not equivalent to those elements of the culture which are outside the market place, our economic system, because the economic system is given primacy, historically and culturally. Enormous corporate centralization, and thus corporate policy making, has effects upon our lives probably as clear and as determinative, as any other kind of policy-making.

I mentioned that social policy has been directed toward the maintenance of the existing system, especially for women. We don't have to go over everything: welfare, social security, military spending, etc. We're getting screwed economically all the way along the line. More recently social policy has been directed at changing the social status, social roles of women. Naturally this policy has been directed to the economic sector.

Equal economic opportunity legislation, and affirmative action legislation are the major social policy directed at changing women's economic status. The question is, of course, how effective is it? The answer is, not very. In fact, if you look at very general demographic statistics, such as full-time income for women vs. men, we're worse off than we were at the begginning of the sixties, before this legislation, before this careful social policy to raise the social status of women was ever introduced. The question we have to ask ourselves is, would we have been better off without it? Or has it, in fact, prevented even worse discrepancies from developing over time?

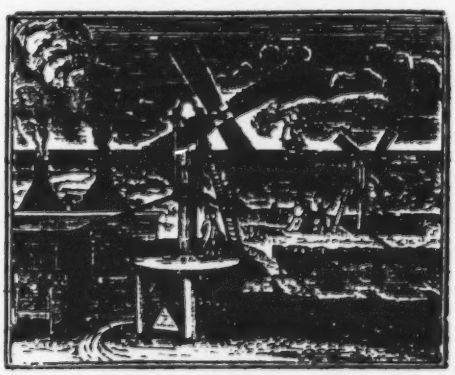
It seems to me that if you look very generally at the framework within which our lives are led, and any changes that might possibly result, one thing is quite clear. Most women's lives have changed more significantly as a result of external, informal activity, outside the economic sector, or outside the range of social change, than by any of the formal social policies which have been introduced all through their lives. And it is through those informal mechanisms that changes are effected in social policy. We have not been very successful. Affirmative action, equal opportunity legislation, in fact resulted from a joke on the part of a southern Senator, who was going to make fun of any kind of ridiculous effort to equalize economic life. He added *sex*, as an amendment from the floor; everybody laughed. That is one of the most effective impulses for social change that social policy organization has had for women.

What are some of the problems in attempting planned social change? We've got to remember always that culture, societal policy, is consistent and has enormous amounts of inertia. All aspects are integrated, and this makes any kind of change in one single area extremely difficult. Because, of course, all other areas have to change appropriately as well. One of the major problems that arises from the use of social policy to affect the nature of women's lives is ghettoization. Jan Zimmerman mentioned that women get assigned to social services, in any kind of federal conference; women's issues are associated with childcare and welfare issues but not economic issues, as when the President invites women into his administration;women's studies in the university—I can't help feeling that over time, what will emerge from women's studies is women's ghettos. This takes the curse off male academics, relieves them from having to learn anything. Other aspects of ghettoization, is something that Judy Smith described; the idea that in New York, horticulture and environmental posts all go to women. It's true that women are being employed in the federal government; they're being employed in HEW. HEW is a ghetto. It's the place where you employ women without seriously upsetting any of the places where real activity occurs.

At the individual level: the business of women acquiring skills, one of the motifs of this conference, may be in fact more pathetic than women not acquiring skills, as we put all this energy into acquiring skills which we can then enact for each other in a ghetto. I don't know if it's worth it, frankly. Barefoot and pregnant is no more separate from significant elements of social action than doing HEW site visits.

In respect to corporate policy, we must remember that women as consumers are central to capitalism, and that corporate concentrations exercise enormous amounts of power in determining what society's social organization is going to look like. For one thing, women can walk right into the "blaming the victim" trap, and say well, we've got to change, we're consuming too much, if women weren't doing this everything would be roses; this isn't true. Another aspect of corporate policy is that corporations, traditionally, are sexist in their policy-making implementation. If women organize themselves around questions of social policy, that is, formal, political planning, they are going to, or have excluded themselves, by definition.

In respect to self-identity, I think it's important to remember that women are members of the culture. It's not just males who internalize a sexist culture. We all carry that around. Culture, a system of ideas, does not float around like balloons in comic strips; when we want to find out what's organizing us, we can't look up there and read it out. Culture is part of our personalities. We jerk when the electric stimulus is applied. So it's important to remember, that in some ways we are ourselves incapable of conceptualizing what a really nonsexist social organization might be like.



John Badgley, Political Scientist; Institute of the Rockies, Missoula, Montana. Participant in feminist/environmentalist ongoing discussions.

Two people who were very important to me as a beginning professional in comparative politics were anthropologists. One was at Columbia, her name was Margaret Mead; and the other was at Harvard, and her name Cora DuBois. Margaret made a very important point, which I think is still true, perhaps interpreted differently by many than she would have when she said it in the late 1940s. She said that we're engaged in one basic revolution, which is symbolized by two inventions: the bomb and the pill. Cora, being a little more subtle, and more to my sentiments, argued very strongly for the malleability of culture. Corky made the point that we all perceive reality through our culture. Many of us don't realize how imbedded that culture is, and yet how malleable, how tractable, how flexible that culture can be, if technology lets us. By technology, I don't mean things, I mean ways in which we do things.

What's exciting and positive to me about both issues of the women's movement and the issues of appropriate technology is the bringing together of human resources and creativity, that has been denied, not only in the West, but generally in Asia as well, in Africa and Latin America. Yin and Yang is a useful way of looking at the world, a useful way of being, because it permits you to be a male, running an army; and to also be female, in terms that mean intimate and tender. Those are notions that we've restricted to poets and not to football teams, which tend to be the basis for engineering schools.

I think you're engaged in a very serious liberation. I don't know why that's threatening, because obviously it shouldn't be; it means survival for the species. The question is, how you break through into the technology that permits you to obtain the goal that I think all of us share? That's very difficult. We have begun to talk about a national conference to bring together people concerned with environment and people concerned about feminism. This hasn't come off. But this will be very difficult, because we are working with traditions that are very ancient, and have a great deal of authority. It does threaten a lot of people who have not talked through why this is such a radical departure, and it engages people who have not thought through why the departure is so absolutely critical right now.

Carpentry Workshop

Ann German, Attorney, Libby, Montana; member, Cabinet Resource Group, Troy, Montana; Environmental Information Center, Helena, Montana.

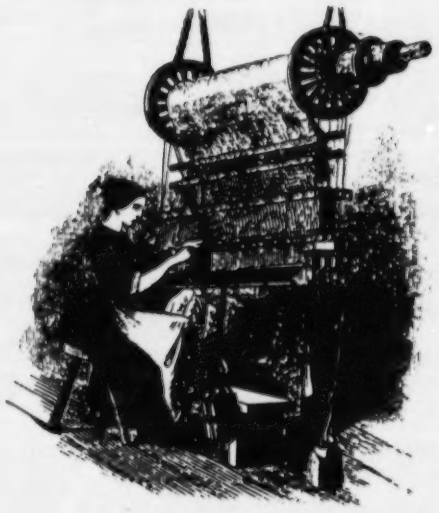
My credentials for speaking here tonight, as the last speaker of the conference, are the credentials of everyone in the room, which is that I'm interested; I am a feminist; I'm living in northwest Montana, where the predominant political issue right now, at least one that has captured the attention of the media, is environmentalism. In the last legislative session, I'm sure a lot of you couldn't help but notice that the two issues dealing with women came out on our side—abortion and ERA. The environmental issues didn't do so well. I'd like to be able to say that that means that the women's movement is where it's at in terms of political power.

I have worked in various political movements, and after I got out of Law School, I became firmly convinced that the only issue with which I could feel comfortable on a 24-hour-a-day basis was feminism. It's something I live and breathe all the time, and I'm aware that it permeates everything I do. But I'm also living up in Libby, Montana, an area that is just being raped, literally, the metaphor is obvious, by the Army Corps of Engineers; and ASARCO is trying to put a big mine in up there. Almost everyone I've met in Libby since I've moved there, considers her or himself an environmentalist, as opposed to feminist. Some of us set up a family planning clinic in Libby, which I consider to be basic to the issue of women's liberation from roles of unplanned pregnancy and childcare. I asked people to get involved in that, and the reactions I got were incredible. One woman said, "I'm not interested in a women's issue; I'm interested in survival. I'm worried about the environment." Another woman said, "I have decided to devote my life to the preservation of wilderness. I just can't worry about birth control." I pointed out to her that if people continue to have kids at the rate that they are currently, even though it's declining, there isn't going to be any wilderness. There are good reasons to be fundamental about issues; I believe that feminism has not only political power, but the potential for answers, because it embraces fundamental questions.

The four panelists this morning gave us a background on how to get started with this revolutionary movement. The history of the women's movement needs to be absorbed and learned by all of us in order to learn where we're going. I think that was beautifully demonstrated by Sue's talk about the fact that women's roles, in the west, are not the mythical roles that we have been led to believe. The Women's History Project in Montana has collected numerous interviews with women who talk about how incredibly difficult it was to work out here.[7]

In terms of the art that Corky brought, I would like to see juxtaposed with those art images, photographs that were taken of those factories, showing what went on in those looms. Women and children were dying to support the industrialists in New England.

One thing I thought was interesting was the difference



between Jan's and Elizabeth's perspectives on the future: Jan told this story that to me is as scary as any story I've heard about what's going to happen to us. I want to race out and get an engineering degree and learn how to run one of those satellites, just in case somebody slips somewhere. And then Elizabeth tells that the appropriate technology movement is a new movement, and there aren't people established as leaders; women can get involved. I am skeptical of that. My guess is that the reason that the appropriate technology movement now is accessible to women is that it's really not important. I also guess that power companies are going to try to control the sun. How are they going to do that—how are they going to sell us the sun?

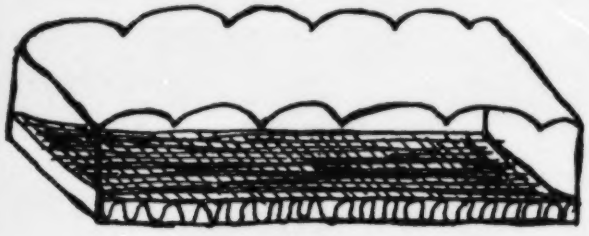
In one of the question-answer sessions following the panel, Corky threw out that she thought it was very important to focus on young women, babes, 3 year olds, 5 year olds, get those women into technological fields. She doesn't foresee that we are going to see this change happen in our lifetimes; or at least we aren't the ones who are going to bring it about. I think this is absolutely fundamental. That's why I believe in birth control; that's where you start, get people educated first; then you approach the rest of it.

What's so exciting about this conference is that it leaves me with a lot more questions than I had when I came. I'm leaving here feeling incredibly excited about what's going on. Listening to Womanshare talk about how they feel about living on the land—they don't see themselves as back-to-the-land, they see themselves as in control of their lives, as political. That's important. I don't mind people living on the land as long as they realize they're doing something political. I've seen too many women up where I live, start haul-

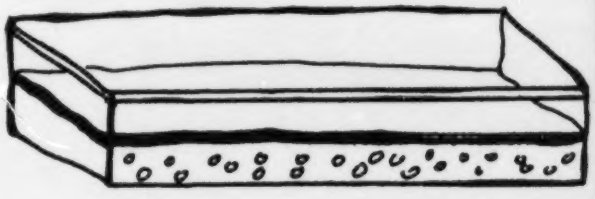
ing wood, becoming environmentalists as a substitute for being professionals. I have incredible difficulty with this, and I hope that I'll be able to establish more contact with those women. But I think it's important to be political in Libby, Montana, and I really think some neat things are happening in our state. I hope that the questions that are raised will continue to be addressed.

The last thing I want to say is that I can't realistically leave the issue of feminism. I'm not going to wake up in the morning some day and be a man, and have feminism disappear. And I don't think that it is possible for women to subsume their own interest to any other movement. Elizabeth says she tries to involve more women in the appropriate technology movement, because she sees that there is hope in the appropriate technology movement. My suggestion is that we try to involve other movements in the women's movement, because that's where it's happening.

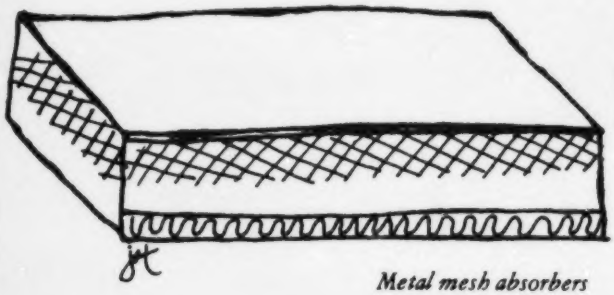
Types of Solar Flat-Plate Air Collectors



Inflatable air beam



Black-painted concrete



Metal mesh absorbers

Fin absorbers

Footnotes

[1]Oral history excerpts from the Boulder Women's Oral History Project. For more information, contact Sue Armitage at Washington State University, Pullman, WA.

[2]Edith Abbott, "Industry," *America's Working Women*, Baxardall, Gordon, and Reverby, eds., Random House, New York; 1976.

[3]Joan Vanek, "Time Spent in Housework," *Scientific American*, Vol. 231, no. 5, Nov. 1974.

[4]Chris Bose, Technology and Change in the Division of Labor in the American Home," *Women's Studies International Quarterly*, Vol. 2, no. 2.

[5]Susan Griffin, *Woman and Nature: The Roaring Inside Her*, Harper and Row, New York; 1978.

[6]Mary Daly, *Gyn/Ecology: The Meta-Ethics of Radical Feminism*, Beacon Press, Boston; 1978.

[7]Montana Women's History Project, Women's Resource Center, University of Montana

Bike Repair Workshop

Cultural Images of Women & Technology
Complete List of Paintings

1. *Pat Lyon at the Forge*, John Neagle, 1826
2. *New England Country School*, Winslow Homer, 1872
3. *The Gun Foundry*, John Ferguson Weir, 1866
4. *The Morning Bell*, Winslow Homer, 1866
5. *Emmie and Her Child*, Mary Cassatt
6. *Our Good Earth*, John Stewart Curry, 1938
7. *Thanksgiving*, Doris Lee, 1935
8. "Steel," *Modern America*, Thomas Hart Benton, 1931
9. *Steelworkers Noontime*, Thomas Anshutz, 1880
10. *My Family*, Edmund Tarbell, 1914
11. *Open Air Breakfast*, William Merritt Chase, 1888
12. *The Bridge*, John Koch, 1951
13. *The Man Trip*, Fletcher Martin, 1948
14. *Forging the Shaft*, John Ferguson Weir, 1877
15. *The Factory Town*, Lois Head
16. *The Strike*, Robert Koehler, 1886
17. *Amalgamated Mural*, Joseph Hirsch, 1930s
18. *Strike Talk*, Selma Freeman, 1934
19. *Trouble in Frisco*, Fletcher Martin, 1938
20. *American Tragedy*, Philip Evergood, 1937
21. *End of the Hunt*, Dale Nichols, 1934
22. *Waiting for Dad*, Winslow Homer, 1873
23. *Spring in Town*, Grant Wood, 1941
24. *Idle Hours*, Julian Alden Weir, 1888
25. *The Wyndham Sisters*, John Singer Sargent, 1900
26. *Ariadne Asleep on the Island of Naxos*, John Vanderlyn, 1812
27. *William Rush Carving His Allegorical Figure of the Schuylkill River*, Thomas Eakins, 1877
28. *Persephone*, Thomas Hart Benton, 1939
29. *Fall Plowing*, Grant Wood, 1931
30. *Mother Earth Laid Bare*, Alexandre Hogue, 1936
31. *The Jealous Lover of Lone Star Valley*, Thomas Hart Benton, 1930
32. *June Knight*, Henry Koener, 1948
33. *Automat*, Edward Hopper, 1927
34. *Day Shift*, Francis Criss, 1940s
35. *The Turret Lathe Operator*, Grant Wood, 1925
36. *Jane Reed and Dora Hunt*, Clarence Carter, 1941
37. *American Shrimp Girl*, Philip Evergood, 1954

Conference Workshops

Workshops at the Conference were of two types: information exchange and "hands-on". This division was designed to give both theoretical information on the areas affecting women and technology, elaborate some of the obstacles preventing us from obtaining access to technology, and give practice with women's traditional skills as well as non-traditional equipment and tools operation.

Information Exchange

Math Anxiety—Judy Smith, Missoula

Non-traditional Jobs—Diane Sands

Women's Land Collectives: Back-to-the-Land—
Sally Mauk, Heron, MT
Kayla Weiner, Heron, MT
Billie Miracle, Grant's Pass, OR

Working with Women and Appropriate Technology—
Judy McGee, Butte, MT
Elizabeth Coppinger, Seattle

Women and Regional Energy Issues—Ann McMillan, Guernes Island, WA

Hands-On

Chain Saw Operation—Marcia Hogan, Missoula

Weaving—Deanne Sandholm, Missoula

Building Solar Oven—Rebecca Arensberg, Marta Bensco, Missoula

Self-Health—Martha Towle, Kathleen Coyne, Missoula

Bike Repair—Leslie Underhill, Linda Lang, Missoula

Carpentry—Melissa Young, Seattle

Women's Land Collectives Workshop

Chainsaw Operation Workshop

Feminist Access and Use of Computers

Jan Zimmerman (computers, communications, electronics)
13674 Boquita Drive
Del Mar, CA 92014

Kristin Kaltenstein (information and communication technologies for
1089 E 19th Ave communities)
Eugene, Oregon 97403

Debra Brecher (feminist application of computer technology,
Women's Information Exchange networks)
1195 Valencia St.
San Francisco, CA. 94110

Women's Imput, Inc. (computer services, literacy, information
54 Circuit St. networks)
W. Meford, MA 02156

Barbara Parker (for Natl. Council for Res. on Women, project
Data Base Project Coor. with the Amer. Lib. Assoc. and Fed. of
Women's Studies Program Business & Professional Women)
Ketchum 30 Campus Box 325
University of Colorado,
Boulder, CO 80309

Jaime Horowitz (computers in the home as a means of reprivat-
57 West 82nd Street izing women; The Domesticated City)
New York, NY 10024

Impact of Computers on Women's Employment

Working Women (published "Race Against Time: Automation of
1224 Huron Road Office Work, 1980)
Cleveland, Ohio 44115

Lin Nelson (automation, job displacement, women and the new technol-
112 First Street ogies)
Ithaca, NY 14850

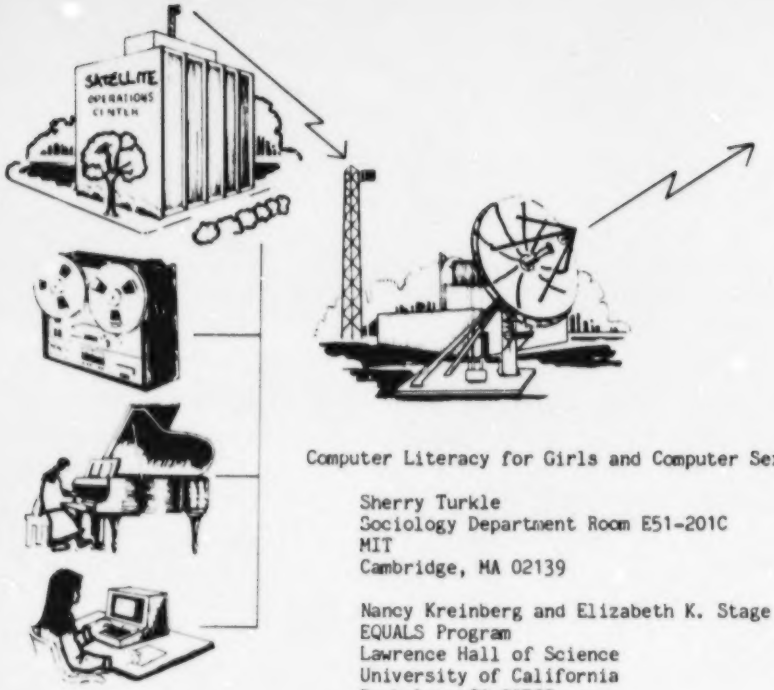
Women's Occupational Health Resource Center (VDT health hazards,
School of Public Health research on VDT working conditions)
Columbia University
60 Haven Avenue B-1
N.Y., N.Y. 10032

Dr. Margaret Benston (about how programming will be clerical
Women's Studies Department job in future and bad for women)
Simon Fraser University
Burnaby, British Columbia, Canada

Dr. Barbara Gutek (computers in the office)
Department of Psychology
Claremont College
Claremont, CA 91711

a bibliography available from Ontario Ministry of Labour
"Women, Microelectronics and Employment"
John Ford and Alan Miller, 1981

book: Women and the Chip: Case Studies of the Effects of Informatics
on Employment in Canada, Heather Menzies, Institute for Research
on Public Policy, Montreal, 1981)



Computer Literacy for Girls and Computer Sexism:

Sherry Turkle
Sociology Department Room E51-201C
MIT
Cambridge, MA 02139

Nancy Kreinberg and Elizabeth K. Stage
EQUALS Program
Lawrence Hall of Science
University of California
Berkeley, CA 94720

Liza Loop
People's Computers, Inc. or 3781 Starr King Circle
Computertown USA Palo Alto, CA 94306
415-323-3111

Suggested Readings List:
Women and Technology Project:
January 1983

<u>WOMEN AND TECHNOLOGY</u>

"Appropriate Technology and Appropriate Roles for Women", Linda Capek Armstrong, <u>Futurics</u>, Vol. 4, No. 3, p.233, 1980.

"From Virginia Dare to Virginia Slims" Women and Technology in American Life", Ruth Schwartz Cowan, Society for the History of Technology, 1979.

<u>Proceedings of the Conference on Future, Technology and Woman</u>, Women's Studies Department, San Diego State University, San Diego, CA. 92182.

"Reproductive Engineering: the Final Solution?", Jalna Hanmer and Pat Allen, <u>Feminist Issues</u>, Vol. 2, #1, 1982, p. 53.

<u>Something Old, Something New, Something Borrowed, Something Due: Women and Appropriate Technology</u>, Judy Smith, second edition, Women and Technology Project, 315 S. 4th E., Missoula, MT 59801, 1980.

<u>Taking Hold of Technology Topics Guide</u>, AAUW, Sales Office, 2401 Virginia Ave., NW, Wa. D.C. 20037, 1981.

Greenhouse Effect:
glass admits sunlight, but traps heat

APPROPRIATE, ALTERNATE AND OTHER VIEWS OF TECHNOLOGY

An Assessment of Technology for Local Development, Office of Technological Assessment, Wa., D.C., 1980.

"The Political Philosophy of Alternative Technology, Historical Roots and Present Prospects", Langdon Winner, Technology in Society, Vol. 1, 1979.

Radical Technology, edited by Boyle and Harper, Pantheon Books, 1976.

Small is Beautiful, Economics as Though People Matter, E.F. Schumacher, Harper and Row, 1973.

Soft Energy Paths, Amory Lovins, Harper and Row, 1977.

FEMINISM, ENVIRONMENTALISM, APPROPRIATE TECHNOLOGY

"Out of the Past: Women and Nature", Carolyn Merchant; "Into the Future: Women and Nature", Judy Smith; in Future, Technology and Woman, available from Women's Studies Department, San Diego State University, San Diego, CA 92182.

Eco-feminism: Papers from the Women and Life on Earth Conference, (of particular interest, Feminism and Ecology by Amy Swerdlow), P.O. Box 580, Amherst, MA 01002.

"Feminism and Ecology", Shulamith Firestone, Dialectic of Sex, Bantam, 1970.

"Feminism and Environmentalism: Creating an Appropriate Future", Judy Smith, Northwest Women's Studies Association Meetings, 1979; available through Women and Technology Project.

"Patriarchy as a Conceptual Trap", Elizabeth Dodson Gray, in Alternative Futures, Vol. 4, # 2-3, 1981; "The Earth is Not Our Mother", New Roots, Nov. 1980.

Something Old, Something New, Something Borrowed, Something Due: Women and Appropriate Technology, Judy Smith, second edition available through Women and Technology Project.

Proceedings: Women and Technology: Deciding What's Appropriate, 1979, available through Women and Technology Project.

"Appropriate Technology and Appropriate Roles for Women", Linda Capek Armstrong, Futurics, Vol. 4, 1980.

A Handbook for Women on the Nuclear Mentality, Susan Koen and Nina Swaim, WAND, Box 421, Norwich, VT. 05055

Ellen Swallow, the Woman Who Founded Ecology, Clark, Follett Press, 1973.

Woman on the Edge of Time, Marge Piercy, Fawcett-World, 1977.

The Death of Nature: Women, Ecology and the Scientific Revolution, Carolyn Merchant, Harper and Row, 1980.

Discussions of a FEMINIST SCIENCE

"A Feminist Critique of Scientific Objectivity", Elizabeth Fee, Science for the People, Vol. 14, #4, p.5, 1982.

"Feminism and Science", Evelyn Fox Keller, Signs, Vol. 7, #3, p. 589, 1982.

WOMEN AND ENERGY

"Summary of Women's Testimony on National Energy Plan II", Federation of Organizations for Professional Women, 1981.

Women: Tapping a New Resource for Energy, Consumer Action Now, 355 Lexington Ave., N.Y. 10017, 1980.

WOMEN AND RESOURCE DEVELOPMENT

NORTH AMERICA
Beyond the Pipeline, Women's Research Center, Vancouver, B.C., 1979.

Women and Energy Development: Impact and Response, Elise Boulding and Betsy Moen, University of Colorado Boulder, CO. , 1979.

"Women Too", Mcgrath, Inside the Alaska Pipeline, Celestial Arts, Milbrae, CA.,1977.

THIRD WORLD DEVELOPMENT
Development as if Women Mattered: an annotated bibliography with a third world focus, May Rihani, Overseas Development Council, 1978

Third World Women Speak Out, Perdita Huston, Praeger, 1979.

The Tribune, A Women and Development Quarterly, Internaticnal Women's Tribune Centre, 305 E. 4th St., N.Y., N.Y. 10017.

MATH ANXIETY, AVOIDANCE

Mind Over Math, Stanley Kogelman and Joseph Warren, McGraw-Hill, 1978.

Overcoming Math Anxiety, Sheila Tobias, Norton, 1978.

Women and the Mathematical Mystique, ed. Lynn Fox, Linda Brody and Dianne Tobin, Johns Hopkins Press, 1980.

OTHER INTERESTING APPROACHES

Against the Grain: A Carpentry Manual for Women, Iowa City Women's Press, 1977.

Country Women: A Handbook for the New Farmer, Tetrault and Thomas, Doubleday, 1976.

Greasy Thumb Automechanics Manual for Women, Iowa City Women's Press, 1976.

The Techno/Peasant Survival Manual, Dowling, Bantam, 1980.

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WOMEN AND TECHNOLOGY NETWORK

The Women and Technology Project compiles and distributes a Women and Technology Network and a variety of Women and Technology Resource Sheets for people interested in all issues concerning women and technology. The Network is set up to connect people with similar interests, and is used to list skills and resources they are willing to share. The Women and Technology Project also encourages Network members to use the listings for announcements of meetings, conferences, publications, etc.

Resource Sheets include : Women and Computers, Women and Energy, Suggested Reading List on Women and Technology and Readings on Connections between Feminism, Environmentalism, Appropriate Technology. Resource Sheets are available for $.25 per copy.

To be listed in the Network, please return this form by April 1, 1983, with $3 to cover our postage and reproduction costs. We'll compile the list and send copies to all who have responded.

Name_____

Address_____

Phone_____

A few words about yourself/your organization:

Your specific interests in women and technology, energy, nontraditional skills (including projects you would like to work on):

Skills and resources that you'd be willing to share:

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